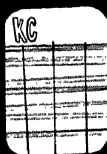


kansas city



public library

kansas city, missouri

Books will be issued only
on presentation of library card.

Please report lost cards and
change of residence promptly.

Card holders are responsible for
all books, records, films, pictures
or other library materials
checked out on their cards.

DATE DUE

THE UNIVERSITY OF CHICAGO LIBRARY

7/16/79
JUL 16 1979

JUL 16 1979

1

Days from Seventy-Five to Ninety

Also by Edward R. Hewitt

THOSE WERE THE DAYS

Days from
Seventy-Five to Ninety

by
EDWARD R. HEWITT

DUELL, SLOAN AND PEARCE
New York

COPYRIGHT © 1957 BY EDWARD R. HEWITT

All rights reserved. No part of this book in excess of five hundred words may be reproduced in any form without the permission in writing from the publishers.

Library of Congress Catalog Card No. 57-5878

PRINTED IN THE UNITED STATES OF AMERICA

VAN REES PRESS • NEW YORK

DEDICATION

To my beloved wife, Mary Ashley Hewitt, with whom I lived in perfect happiness for over fifty-three years without a quarrel or any cross words ever passing between us. She was truly the most wonderful of women.

Preface

EVER SINCE THE PUBLICATION IN 1943 OF MY BOOK *Those Were the Days*, I have received many requests to write a continuation of my life story, so I am attempting it, although life after seventy-five does not have the same types of interests and experiences as those related in the earlier book.

Yet it has interesting episodes and tells of a life in old age which can be both interesting and rewarding. The knowledge gained after a long life can, I hope, be of use to many people who fear old age as a time of frustration, illness, unhappiness, and boredom. None of these has been my lot, and if Mrs. Hewitt were only still with me, I would be as happy as ever. These results are due partly to my good fortune, but I feel that what I have done with my life has had a great deal to do with my present state of mind and healthy body.

I want to tell this story so that others may take advantage of my experiences so far as they can, and direct their own lives into more pleasant channels than might otherwise be the case. If I can succeed in doing this, the writing of the book will have been well worth while. My chief desire during my later years has been to do something for others rather than for myself. Fortunately I now have sufficient income, even after paying taxes, for all my needs, so I am free to do things which I feel are worth while.

The greatest satisfaction in life is to feel that it has not been

Preface

wasted and that one has returned a measure of good for what one has received from the world. Each of us must decide what he is fitted and able to do, and then one should do it with a will. This is my basic philosophy of life and I intend to carry it out to the end.

Contents

Preface, vii.

PART I

My Family and How I Live at Present, 3.... New House Built, 8.... Burst Appendix, 14.... My Diary, 15.... Magazines and Books, 17.... A Dream in November 1948, 21.... A Most Distinguished Friend, 22.... Grandpa's Decisions, 26.

PART II

Increasing the Feeding Value of Hay, 31.... Garden, 38.... Trout Raising, 40.... Japanese Saki Deer, 42.... Salmon Fishing in Ireland, 43.... Spain, 46.... Carpentry, Machine Work, and Laboratory, 53.... Distilled Liquors, 58.... Book Mend, 60.... Materials for Artistic Work, 62.

PART III

Good Health in Life and Old Age, 67.... Paget's Disease, 75.... Overweight, 76.... Alcohol, 78.... Smoking, 80.... Coffee, 81.... Lecithin, 83.... Sex Hormones, 86.... Diet, 88.... Commandments for Health, 93.

PART IV

The Modern Economic Revolution, 99.... My Philosophy of Life, 117.... The Future, 127.

Part I

My Family and How I Live at Present

MRS. HEWITT AND I HAD FOUR CHILDREN. MY DAUGHTER LUCY died of aplastic anaemia, for which there is no known cure. She left two boys and one girl. The girl married and has one girl and one boy. One of the boys married and has a son and a daughter. My daughter Candace has two sons, both of whom have two girls. My son Ashley had two girls and one boy. None of these grandchildren has yet married. My son Abram has one married son with a boy and a girl and a married daughter with one son. His other daughter is still unmarried. Abram also has three young sons, making five children in all. These descendants provide much family interest and assurance that the stock will not soon run out.

During winter I live in my house at 48 Gramercy Park, New York, which my father gave me in 1900. It was built in 1846 and badly built at that. It is in constant need of repairs, but it just suits me and I will live here until the end. My daughter, Mrs. Stevenson, and her husband Gordon live with me in winter, but in summer I go to my farm in the Catskills and now live there alone with many visits from my family.

I built this house for Mrs. Hewitt after our old house burned. I have two sitting rooms and seven bedrooms so that I can accommodate numbers of the family when they come. They all like the farm, and I have made arrangements so my son Abram can keep it going for a recreation place for the whole family, after I pass away. The younger generation cannot pos-

Days from Seventy-Five to Ninety

sibly accumulate enough money to have a country home until well along in life, and then it is too late for the children to get anything from it. I feel that if I can provide a summer resort for them I will be doing one of the best things possible for their happiness and health. In order to accomplish this I must make my farm self-supporting as I have not a large enough personal estate to leave a trust fund for the support of the place. Later I will tell how I am doing this.

In my old-fashioned twenty-five-foot house in New York, the basement is used for the kitchen and servants' rooms. The first floor has butler's pantry, dining room, and a large parlor. The second floor has two sitting rooms, one for me and one for my daughter. She and her husband sleep in the extension over the butler's pantry. The front entry room is a den and workshop for my daughter. The third floor has my bedroom and bath, and the two front rooms are kept for guests or members of the family when they come. The attic floor has three storerooms and the rest of it is used for my carpenter shop, machine shop, and laboratory. These arrangements make us most comfortable.

Every day after lunch I take a nap for an hour. Then I work in my shop, or write and read, till teatime at five o'clock. My mother always had tea then and I feel that it is necessary. Friends drop in and the family assembles. It is a delightful custom. After tea, I generally read, look at the evening paper, and listen to the radio. I don't care about television and rarely look at it.

On Tuesdays I go to the Dutch Treat Club for lunch and on Thursdays to the Anglers Club, as this is my girls' day out. I often go to the Coffee House Club to lunch Fridays, and almost always to the Century Club for lunch Saturdays. This

My Family and How I Live at Present

brings me in contact with enough people every week so I will not get stale. I gave up my position as consulting engineer for the Mack Truck Company in 1954, after forty-two years. Younger men now do this better than I can.

My twenty-seven-hundred-acre place in the Catskills is mostly woodland but I have several hundred acres which can be put in hay. I have built a small chemical laboratory there where I can make soil analyses and do general chemistry as necessary. This keeps me busy all summer, with plenty to do.

During my two girls' two-week summer vacation, Mrs. Stevenson generally drives me on a trip to visit friends or places I want to go to. I move to the farm about the tenth of May each year and, since I vote there, stay until the day after election. All this provides me with an active and interesting life. I can do as much as I feel I am able to do without getting too tired. In old age, one must live within one's physical capacity and not overdo as when younger. This was hard for me to learn at first, but I am now used to it. Our hearts have only so much work in them, and it is unwise to use them up too soon.

One of the most important things in life, in order to have a pleasant old age, is to provide oneself with a number of interests or hobbies that can be carried on after business or professional activities cease. Most people don't think of this during their active years, and when retirement comes they are left with nothing to do. One hobby is not enough to have as it may be one which cannot be carried on in old age. A number of interests is advisable to insure having at least one left. I have always had many, but I am now able to do only a few of them.

I was very fond of upland bird shooting, but I can no longer do this as the walking is too strenuous. I have fished all my life, and still can for trout and salmon, but I can no

Days from Seventy-Five to Ninety

longer waded in swift rough water and therefore do not enjoy it as much as I once did.

Musical instruments and playing them provided another of my favorite activities, but I can no longer keep this up since I injured my hands. I have to confine myself to things I can do with my hands as they are. I can still do carpentry, machine work, and chemical work in my laboratory as well as ever. I can also bind and repair books by my own process, which I will describe later. These things, together with writing books and papers, keep me busy.

I would like to tell about my two servant girls, in whom I am so fortunate. They are sisters and Mrs. Hewitt engaged them thirty years ago. Now they are part of the family; they know all our friends and just how we like to live. They devote themselves to us. Betty is the best cook I have ever known; they train them well in Scotland. Mary looks after the house beautifully, but she is a demon cleaner. Few people are so lucky these days to have such wonderful servants who will stay with them for a lifetime. I have of course made provision for them after I pass on. They more than deserve it.

Friends I meet at my clubs often remark on the wide range of knowledge and interest I seem to have on all kinds of subjects. One day, a while ago, I made a list of things I had studied carefully and found they covered a wide range of activities. While I no doubt would have been a much greater success if I had devoted myself to one line of work, I feel now that this great variety of interests which I have had in the past, and the studies connected with them, has given me a much wider view of the world than is common. I do not regret not having made a great success of anything. I notice that those who are very successful do not have the varied interest in the

My Family and How I Live at Present

activities of life that I have. After all, success is not a god to be worshiped. It is far better for ourselves, and for our friends and families, to make a life as interesting as possible. Our economy is progressing faster than we can assimilate its results, and it is not important to make it go any faster. I do not regret not having accomplished more than I have.

As a matter of interest I will note some of the things I have studied intensively in the past:

The manufacture of glue and gelatin.

The manufacture of iron in blast furnaces and the mining of ore.

The principles of aerodynamics and aeroplanes.

The gas engine and automobile design. From this work came the Mack Truck Company.

Mechanical engineering, which finally admitted me to professional practice.

Chemistry, for fifteen years.

Farming and agriculture, with the running of two different farms.

Fishing and practice of same for trout and salmon, with the running of a hatchery and writing a number of fishing books.

Music in theory and also old instruments and collecting and repairing them.

Invention of a new method of binding and repairing books.

Distilled liquors and development of a process for making good distilled liquors rapidly.

Photography, beginning in Germany with a complete laboratory course, even including making of plates.

Petroleum oil cracking.

Human nutrition.

Days from Seventy-Five to Ninety

Fly tying and the development of new patterns of flies.

New designs of fishing reels.

Making furniture.

Making motion-picture cameras and motion pictures.

Piston rings for gas engines.

The manufacture of radiators for automobiles.

Development of an improved method of growing hay high in protein.

This makes quite a list of studies. In every case I always secured all the books relative to the subject I could find. It is no wonder that I now have quite a fund of information stored up.

New House Built

IN 1940 MRS. HEWITT BECAME AN INCURABLE INVALID AND I had to devote myself to looking after her. Our house in the Catskills burned in August, 1940, and the shock of this made Mrs. Hewitt much worse. I felt that it would be good for her if I rebuilt the house much as she had known it, so I began at once making drawings and plans. I had no architect, but did all the work myself. All the timber was cut on the place and I made use of the timbers of an old barn to great advantage. Hemlock is very porous wood which dries out rapidly, and I knew that it could be used freshly cut without danger of rotting. My house construction was not orthodox as I wanted to save lumber as much as possible, so I suspended the upper floor from the roof rafters, using them in a truss. The room partitions made the truss connections. In this way I used only six-inch beams in place of ten- or twelve-inch beams which

New House Built

I would have had to use for a seventeen-foot span. Carried in this way, the upper floor proved very firm and perfectly satisfactory. The outside of the house and roof was made of asbestos shingles to avoid repairs, painting, and fire danger. All the outside trim was stained with linseed oil and turpentine, half and half, with color added. This was done to avoid repainting every few years. Stained wood will last outdoors indefinitely and there is no outside paint which will last more than a few years.

The house was planned with two sitting rooms, with the hall and stairs between, so when the children come they can make all the noise they like in one sitting room and we can be quiet in the other. This is a great improvement over most houses. The dining room, butler's pantry, and kitchen are in a wing so we will not hear the servants. There are three bedrooms downstairs and four upstairs—plenty of room for visitors. All the doors on the ground floor are five-feet wide with sliding doors hung from above. This way two people could walk through, helping Mrs. Hewitt. Her wheel chair could go anywhere for there are no door sills. All the trim and flooring of the lower story is of wild cherry, cut from our land. The walls are plywood so that I never have any papering or redecoration to do. There are five bathrooms, and every room has a wash basin.

Since we cannot have an oil furnace, because we have to make our own electricity, I took the insides out of a hot-air furnace and replaced them with a bottled-gas burner, regulated with a thermostat. The hot water, kitchen stove, icebox, and my laboratory are all on the same bottled gas and it costs me only a little over fifty dollars a month for this wonderful service. This is surprisingly cheap.

Days from Seventy-Five to Ninety

When finished, the house cost exactly sixteen thousand dollars to build and furnish, including what furniture I had to buy. It could not be duplicated now for fifty thousand dollars. I began work on the house, with fifteen carpenters, October twelfth and had it enclosed with windows and roof on November twelfth. We closed down then because the men could not get in on account of snow. We finished the inside trim and floors in the spring and moved in, in May. There have been no repairs on this house in sixteen years except for some windows blown in by a hurricane. For an amateur architect I did a good job, and it is the pleasantest house I have ever lived in.

There is a spring which furnishes water, ten feet higher than the peak of the roof, and it has never given less than ten gallons of water a minute in the worst dry weather.

Mrs. Hewitt's bedroom looked out through a big window onto her flower garden so she could see her flowers from her bed. I arranged a sprinkler system covering the whole garden with sprinklers spaced ten feet apart. All played at once and cooled the air remarkably when it was hot and Mrs. Hewitt was sitting under her apple tree. Of course I had a big ten-thousand-gallon cement tank to accumulate the water for this.

Mrs. Hewitt's illness finally became so severe that it required two nurses to get her up at night. This became a serious matter in house arrangements and expenses. I made up my mind that one nurse could do the work if she had the right apparatus. I made a turntable to stand by the bed, which had two hand rails for Mrs. Hewitt to steady herself with when she stood on it. The nurse could then swing the table around 180 degrees and Mrs. Hewitt could sit on a toilet chair which I made of very heavy construction so there would be no danger of its

New House Built

moving on the floor. The nurse could easily swing her back and get her to bed. This worked perfectly for over four years. This device ought to be available for other sick people. I have offered it for use to others.

Mrs. Hewitt's death in November, 1945, was the most wonderful I have ever heard of. She suffered no pain whatever. She had been up and was sitting on the side of her bed, when she said to the nurse, "Mr. Hewitt says that when swans are going to die, they fly high in the air and sing a song. I am going to sing one now." She began "Onward Christian Soldiers" and then fell back unconscious. She never regained consciousness again during the week before she died. Some small artery must have burst in the brain just as she felt her end coming. It was, of course, a dreadful shock to me, but a most merciful dispensation for both of us.

In these days when there so many divorces and broken homes it may be well to tell of one marriage which was perfect. We lived together for over fifty-three years and there never was a cross word or any quarrel between us in all that time. Of course we disagreed at times, but I soon found that she was always right. I would have done far better with my life if I had followed her advice more closely. She was far wiser than I. If there can be a mating of souls in marriage, it did take place in our case. She was the most wonderful person I have ever known in her kindness, generosity, unselfishness, and complete understanding of others. She had a sincere desire to see others live their own lives in their own way. Although she almost always knew what was best to be done, she never forced her ideas on anybody. This is a most rare quality, and to that I attribute much of our great happiness. In all the years we spent together, I never knew her to ask for anything for

Days from Seventy-Five to Ninety

herself. She was always looking out for others. Whenever I became more prosperous, I set aside any money I could spare in a joy account in her name, separate from any house or personal accounts. She was to spend this in any way she chose, with no accounting to anyone. At times this account was quite large and at other times, when I had no money, small. I never knew or asked what she did with it, although she sometimes told me. After she died I received a letter from an old friend of hers, who had married in Scotland, saying that Mrs. Hewitt had helped put her three children through school and college. They were now all well settled in life. One boy was a manager for Vickers Sons and Maxim. Another was running a big iron furnace, and the girl was head nurse in a hospital. She wrote that her husband had sold some coal lands he had inherited and wanted to repay what Mrs. Hewitt had spent for the children. He was placing a fund of fifty-five hundred dollars in Barclays Bank to my account. Of course, this money was again used for others. Many of her other gifts turned out equally well. I believe that if more men would give their wives greater freedom of action, their marriages might be more successful.

My life became so closely bound up with hers that even now when some lady expects me to kiss her at meeting or when saying good-by, a feeling of shock comes over me as if I were doing something wrong to Mrs. Hewitt. Of course no one could suspect such a feeling after ten years, but it is still there.

For her funeral I found two beautiful alabaster urns in one of which her ashes were placed. They were copies of old Roman urns and most suitable for her classic spirit. One urn was cracked and this is the one in which my ashes will rest.

New House Built

My eldest son, Ashley, is a mechanical engineer. He was for some years with the Mack Company and subsequently went to California and has been doing engineering and inventing there. He is just getting on the market a butane-gas carburetor which seems to be an excellent job, and which I hope will be financially successful.

My younger son, Abram, went through Oxford with honors and became a lawyer. He has been in government service, first in the electrical farm service and subsequently in the Intelligence Department, where he did good work. He now resides in New York and works with banks and trust companies in establishing and financing new industries.

The grandchildren are just coming to the time when they are in the beginnings of their professional careers. Peter Cooper Stevenson is a chemist and physicist for the Atomic Energy Commission at their plant in Livermore, California.

Abram's son, Edward R. Hewitt II, has just been made head of the oil exploration expedition sent to Yemen by the Empire Trust Company. He has made an excellent record as an oil geologist.

Abram's daughter, Camilla, won a scholarship at Oxford in competition with twenty-five hundred others, and is now there for three or four years' study. She seems to do well in everything she undertakes.

Another grandson, Hewitt Pantaleoni, is now completing his work at Harvard for his Ph.D. in music. He intends to conduct choruses and orchestras, for which he has a special talent.

The others are not yet far enough along in their work to know what they will do, or how well they will do it. So far as I can see, they all have ability and a willingness to work

Days from Seventy-Five to Ninety

and produce, and are fine upstanding, moral people. That is the best we can expect. I look forward to a good life for all of them.

Burst Appendix

ONE AFTERNOON, AS WE WERE HAVING TEA UNDER THE APPLE tree by the garden, I felt a sudden chill come over me. I rose and went into the house, saying nothing to Mrs. Hewitt as I did not want to alarm her. I lay down on the lounge and called the medical student who was looking after the children that summer. I told him to get out my microscope and make a blood count. Doing this, he found the white blood cells were 17,000 instead of the normal count of about 5,000. I knew at once that I had a severe infection. I felt a pain just then, over the appendix, and knew I had appendicitis.

My daughter, Mrs. Stevenson, was sent for, and in the meantime I called up Dr. Donald Guthrie, whom I knew well, at the Packard Hospital in Sayre, Pennsylvania. I told him of the blood count and pain and that I thought I had appendicitis. He told me to get to the hospital at once and he would be ready to operate. Mrs. Stevenson drove me the 120 miles to Sayre as rapidly as possible. We reached there before ten o'clock. During the drive, I felt that something had happened and I was in quite a lot of pain.

Dr. Guthrie was to operate at once. I told him to sew me up tight with no drains, for I had had them in a former operation and knew that they take a long time to heal and can be very troublesome. Dr. Guthrie told me they did not do this with abdominal operations, but he would do it for me if I insisted and operate again, if necessary. When he got inside,

My Diary

he found the appendix burst and the whole intestinal cavity infected. He used twenty-five grams of sulfanilamide to sterilize this and told me that he doubted very much if I would recover. The elimination of the sulfanilamide was very troublesome, but the infection disappeared and I was healed up and fishing in the Neversink in twelve days. My insistence on no drains saved me a lot of convalescence.

Here is a case where my scientific training, together with instant decision, saved my life. I was operated on within five hours of the chill. Longer delay would certainly have been fatal.

My Diary

WHEN I WAS TWENTY-FOUR, I BEGAN A PERSONAL DIARY IN which I recorded my beliefs and feelings at that time in full for my own perusal only. This diary covered the period while I was in Germany and met Mrs. Hewitt and slowly fell in love with her, my feelings when I returned to America after leaving her in Europe, and my great burst of emotion when she came back and I first saw her again, and knew at once that I would win her, and must do so to fulfill my own life.

I can scarcely believe now that I ever was the person who wrote this diary. I am surprised that she was willing to take me as I was then. I have not looked at this diary since I closed it after my marriage, honeymoon, and the birth of our first child. It is revelation in the development of a human character led and helped by a better influence.

Our attachment to each other did not have its origin in physical attraction. In fact, my diary tells me that I did not regard her as particularly good-looking. She was tall and had

Days from Seventy-Five to Ninety

a good carriage, but her chest was not over four-inches thick from front to back, and she did not have good color or skin. I once heard one of my sisters say, "How could Teddy ever fall in love with such a slab-sided girl?" However, her personality and spirit simply overpowered me and I felt that I must live with her through life. The day after we became engaged in New York she told me that she had never looked in a mirror in her life to see how good-looking she was, as she did not care. She looked for the first time the day we became engaged. My family and I proved to be wrong. After our first child was born she filled out in her chest and acquired a most perfect figure. Her skin became wonderful and her color fine. Her whole appearance changed. From the time she was twenty-eight until her middle forties, she was one of the most beautiful women I ever saw. Whenever she came into a large gathering or a ballroom, everyone would turn and ask who she was. She was always the most distinguished person in the room.

I remember one little incident which amused both of us. We had been to a show with friends and stopped at Delmonico's for supper. The next day the following advertisement appeared in the *New York Herald* personal column: "Will the very beautiful tall brunette who left Delmonico's about 12:30 last night, wearing an otter cape over a gray dress, kindly communicate with most ardent admirer?" I answered the advertisement as follows: "Brunette leaving Delmonico's last evening after 12:00 P.M. will meet ardent admirer in the center of the Brooklyn Bridge at midnight tomorrow." Since it was zero weather, I thought that might cool him off.

Most fortunately for me the sex urge has never been dominant. I can think of no worse curse than when it is. I speak

Magazines and Books

feelingly on this subject because my own brother's life was wrecked by it. His was one of the most productive and valuable lives to save. I do not remember ever having noticed girls at all until I was about sixteen years old, and then only casually. I was too busy with my own interests.

Sex is purely an animal instinct. It is all right at the proper times and places as it is necessary for the reproduction of the race. But it should never be allowed to become the dominant passion in life if true happiness is to be achieved. Anything can be sold by advertising and in our society the constant worshiping of sex and advertisement of it do unlimited harm, causing endless unhappiness and broken lives. I was indeed fortunate to escape its domination.

Magazines and Books

ONE OF MY FRIENDS HAS SUGGESTED THAT IT WOULD BE OF interest if I were to list the current magazines I read, to show the range of my interests. It is wonderful that our monthly technical literature enables one, in a remote farm in the Catskills, to have the panorama of what is going on in the world pass before him. Such a thing was not possible in past generations, for there was no such thing as this monthly literature. Today, no one need be uninformed on any subject if he cares to follow it from month to month.

Fortunately in my early years, I met and knew both Heinrich Schliemann, who excavated Troy, and Sir Austen Henry Layard, who excavated Nineveh. They told me of their work and fired my imagination. My interest in archaeology has continued all my life. I once helped dig up a treasure of British-

Days from Seventy-Five to Ninety

Saxon coins in the Roman Forum, but this was my only active archaeological experience.

The following list comprises what I look over every month:

The Illustrated London News—gives world pictures and news and all new discoveries in archaeology.

The English journal, *Nature*—best summary of all scientific work in the world. They rarely miss anything.

The Reader's Digest—general literary information, current articles, and amusement.

Scientific American—authoritative articles on many scientific subjects.

National Geographic Magazine—world information.

Science Digest—covers general scientific news.

Journal of the American Medical Association—latest medical information.

Science News-Letter—covers general science news.

Modern Plastics—covers this new field.

Soil Science, *The Rural New Yorker*, *The Farm Journal*, *Crops and Soils*, and *The Chemurgic Digest*—all keep me abreast of our agricultural work.

Soils and Fertilizers—an English publication which gives digests of all agricultural papers in all countries the world over. Nothing is overlooked.

Journal of the Society of Auto Engineers—keeps me abreast of aeroplane and car development.

Journal of the American Society of Mechanical Engineers—covers almost everything mechanical.

Industrial and Engineering Chemistry—covers the field of industrial chemistry.

Science and *The Scientific Monthly*—cover a wide scientific field.

Magazines and Books

Antiquity—covers newest in archaeology.

Blackwood's Magazine—good stories every month.

The Townsman—gives me the local Catskill news.

While running through all these takes much time, in doing so I feel that I am still part of the active productive world and know what is going on in the fields in which I am interested. No one can keep abreast of all that is taking place, of course.

In the last few years, I have read the Bible from cover to cover, much of Dickens, Scott, Cooper, Mark Twain, much of Stevenson, all of Longfellow, Stockton, and John Buchan, whom I regard the master storyteller. Also I have read many current books such as *The Sea Around Us*, Sir Leonard Woolley's book on the excavations at Ur of the Chaldees, Huxley's book on the Near East, and many historical novels and biographies. One book I recently read impressed me greatly. It is entitled *The True Believer* but has nothing to do with religion. It treats of believers in causes and contains more real wisdom than any book I have read.

A book called *Topsoil and Civilization* gives an excellent account of the effects of agriculture on history, a subject on which I had written a monograph which I will never publish as *Topsoil and Civilization* covers the ground fairly well.

Fairfield Osborn's book, *Our Plundered Planet*, tells well what men have done to soils all over the world. *The Road to Survival*, by William Vogt, treats the subject even better.

The book, *How Strong Is Russia*, gives a good factual account of Russian climate and primary resources and is very illuminating.

These are only a few of the books I remember. There are numerous others on all kinds of subjects, excepting detective stories. There is enough of that stuff on the radio. I do not

Days from Seventy-Five to Ninety

waste my time on it. I like good literature by good authors, spend little time on stories, and rarely read poetry. I have an extreme dislike for modern poetry, modern art, and modern music. They seem to me a return to the childhood of the race and savagery.

I had one delightful experience with modern art and its devotees. Mrs. Hewitt had a very good doctor friend, who was in charge of the insane on Ward's Island. One day at tea she asked him if the insane ever did any painting. He replied that he used painting as one of the gauges indicating the type of insanity a patient had, and found it very useful. When Mrs. Hewitt asked him if he had any of these paintings, he said he had a great number of them which were surprisingly like modern art. She asked him if he would send a few of these paintings over to our house, saying we would have a dinner to see what the advocates of modern art thought of them.

I put sixteen of the paintings around the dining room and Mrs. Hewitt asked the leading modern art fanciers to dinner. The paintings were much admired and everyone wanted to know where Mrs. Hewitt had discovered such talented artists. At the end of the dinner, Dr. Simon Gregory arose and gave the background of these paintings, all made by hopelessly insane people. He detailed the type of insanity each different kind of "modern art" represented. Of course, this created a storm, but we enjoyed it greatly. I don't think any of these art patrons ever came to my house again. It was worth it.

A Dream in November 1948

A Dream in November 1948

THE FOLLOWING DREAM WAS SO VIVID AND CONTINUED SO LONG that the song the figure sang was impressed on my memory. I got up and wrote it down on a pad at once, just as I remembered it. I have not changed the words I found on the pad in the morning. As I have never written but two short verses in my life, and rarely read poetry, it seems to me that this record is of psychological interest.

I saw a figure wading down a beautiful stream overhung with trees. He was fishing downstream with a wet fly and singing at the top of his lungs in a beautiful voice. He had no hat on, and his head was covered with yellow hair hanging down in curls. I had curls just like them when I was a small boy and my mother cried when they were cut off. He looked like me as a young man, but he wore an Elizabethan ruff about his neck, a jerkin, yellow leather pants, and jack boots. The air, as I remember it, reminded me of that in *Thaïs* which I once heard played in the moonlight beside a trout stream by a Rumanian violinist. He sang the song over several times before he passed me on the bank.

THE ANGLER'S SONG IN MY DREAM

*Sing, little rivers, of your birth among the hills
From brooklets, springs, and raindrops making larger rills.*

*Sing, sparkling brooks and streamlets dancing over stones,
Pools with stiller waters holding trout in schools.*

Days from Seventy-Five to Ninety

*Sing, you larger rivers, with greater trout and salmon
Leaping skyward in the sunshine for no one knows what
gammon.*

*Sing, my soul, with gladness, that I have known you well.
Life is better living since I have known your spell.*

A Most Distinguished Friend

WHEN ASKED TO TELL OF DISTINGUISHED PEOPLE I HAVE KNOWN in the last fifteen years, I can think of only one. In the later part of life I have not been about as much as formerly. This one friend was the Right Hon. W. L. Mackenzie King, premier of Canada. Mrs. Hewitt met him many years ago at a peace conference at Lake Mohunk where they both became bored with the proceedings and spent their time wandering about the grounds. This casual acquaintance developed into a friendship which lasted until he died. He never came through New York at any time that he did not come to see us, even if he had only a few hours. Mrs. Hewitt was really the deciding factor in his becoming premier. It came about in this way.

There was a serious and violent strike at the Colorado Fuel and Iron Company properties. Young John Rockefeller decided to go out there and settle it. Mr. King at that time was his labor adviser. They went out together and King handled the matter with such consummate skill that, when they returned, Mr. Rockefeller offered him a permanent position as his adviser, along with a house in New York and an ample salary.

King came to see Mrs. Hewitt to talk it over before making

A Most Distinguished Friend

his decision. He explained that he was under obligation to put his brother's two boys through college and he had only a moderate salary at that time. Since he was much pinched for income, he was very much tempted to accept Mr. Rockefeller's offer. But at the same time Sir Wilfrid Laurier, then premier of Canada, wanted him to be his understudy in political work. This would ultimately lead to the premiership when the Liberal party again came into power.

Mrs. Hewitt listened to him fully, and then said, "You know perfectly well what you are going to do. Politics is in your blood. Your grandfather engineered the Canadian Rebellion in 1837 and you have been brought up to follow in his footsteps. You will never be happy or contented in a high-salaried position in commercial work. Go back to Canada and fulfill the destiny for which you are so well fitted. Don't give Mr. Rockefeller's offer another thought."

He was persuaded and told Mr. Rockefeller the next day that he had decided to return to Canada. When he became prime minister he wrote Mrs. Hewitt his first letter saying, "But for you I would not now be where I am." He served longer than any other premier of the British dominions and conducted Canada through two wars successfully. He left Canada a great country through his administration.

During his frequent visits to us he told me many things. Some of them can now be mentioned, for he has passed away, and the events have gone by. He said that at one of the great receptions at Buckingham Palace, after the First World War, he was standing together with General Smuts and De Valera. Smuts remarked that here were three men, King, whose grandfather had had a price placed on his head, De Valera, who had been proscribed in the Irish Revolution, and himself, who

Days from Seventy-Five to Ninety

had been condemned after the Boer War. Yet they were all together at Buckingham Palace, well received. Just then King George came to them and asked what they were conferring about. Mackenzie King told him of Smuts's remark, and the King said, "All my loyal subjects in this Empire are welcome here, no matter what they have done in the past." This could not have happened in any other country.

King also told me that he was deeply shocked at the mental state of President Roosevelt when he was conferring with him at the Quebec meeting during the Second World War. He said that Roosevelt was in no condition to comprehend or consider sensibly any question that came up, and he was very worried that the destinies of a great nation should be in such hands at that critical time. He felt that any kind of serious mistaken decision could be taken and confided to me that he felt that Roosevelt was really quite insanely incompetent. I was not at all surprised at what happened at the end of the war. It was this mental derangement which got us into troubles that still plague us today. This was the opinion of one of the sanest political minds of our times.

King also told me that when Gouzenko gave the information about the Russian spy ring in Canada, his agents managed to get into the Russian embassy and examine the premises. He did not say how this was done. They found two rooms with iron doors arranged as prisons, with heavy iron gratings over the windows on the inside where they could not be seen from outside. They also found a furnace in the cellar with an incinerating device large enough to take in a human body, consume it, and leave no trace. He advised our people that the embassy in Washington was also so equipped. This may ac-

A Most Distinguished Friend

count for some disappearances which have occurred in recent years.

It is a wonderful thing to have watched the career of such a man, to have followed him intimately through all his troubles and successes. I never had a better friend or one to whom I was more attached. Mr. Mackenzie King was the most distinguished of my friends in my later years, but I have known many other men of great ability and at the head of their professions.

Dr. Peyton Rous, of the Rockefeller Institute for Medical Research, has been one of my best fishing friends for many years and I look forward to his visit every year. He keeps me informed of the world progress in cancer research, which is of great interest.

Dr. William Williams, who is now head of the Research Foundation and who first isolated and synthesized B₁ vitamins, is one of my good friends.

Dr. Leo Beakeland, who invented velox paper and later Bakelite, was an intimate friend of mine until he died. Our acquaintance began when I first returned from Germany in 1892.

Gano Dunn, who was head of J. G. White and Company and president of Cooper Union and one of our foremost engineers, was always a good friend of mine.

Frank Bacon, head of Ford, Bacon and Davis, the great engineering firm, was also a good friend of mine.

I knew Mr. J. P. Morgan well, for he was a trustee of Cooper Union until his death.

Dr. Clyde Snook, chief physicist for the Bell Telephone Laboratories, kept me abreast of the newest scientific develop-

Days from Seventy-Five to Ninety

ments. We often worked on schemes together. His early death was a great shock to me.

Dr. Nicholas Murray Butler, president of Columbia, was one of my very best friends. I made two long trips with him, one to California and another to Oxford to see him get his Oxford degree. He told Mrs. Hewitt he intended to make me a professor at Columbia. She asked him in what line, and he replied, "In the new line, Professor of Mental Stimulation. We need it." It never came off.

An amusing incident occurred during our Oxford visit. I sat next to Dr. Butler during the proceedings when he was to receive his doctor's degree. The chancellor of the university arose and made his presentation speech, beginning in Latin, "*Vir ornatissimus.*" Butler turned to me, his face pale, and said under his breath, "Do you suppose I am expected to reply in Latin?" I told him of course he must. He then said, "I only hope he makes a long speech so that I can get a vocabulary. I have not thought of Latin for years." When he did receive his degree, his speech was very short and his Latin was not bad. He was scared to death.

Grandpa's Decisions

GRANDPAS SOMETIMES HAVE TO MAKE SERIOUS DECISIONS FOR their descendants. One of my grandchildren came to me one day, much disturbed, and said, "Grandpa, I want you to make a decision for me at once, and you are the only one who can do it. Mother told me to go and have the nurse wash my face. That was all right because it was dirty, but the nurse wanted to wash my ears, too. I told her my ears were part of my

Grandpa's Decisions

neck and there were no orders to wash them. Now I want you to decide, once and for all. Do the ears belong to the neck or the face?"

Solomon would have to decide that one.

I was telling one of my grandchildren tales about the former generations of the family and what they had done and how they had lived. After listening a long time, my grandchild said, "Grandpa, I have often heard you tell about the former generations of the family, but what I want to know is whether you have stopped generating."

Part II

Increasing the Feeding Value of Hay

JUST AFTER THE FIRST WORLD WAR, WE MOVED FROM MY farm in New Jersey to my place in the Catskills because the cities of Newark and Paterson took my New Jersey farm for a reservoir. The Catskill place was largely woods but it had several old farms on it which were not cultivated. At the time I did nothing to improve them because I knew well that it would not be profitable. When the Second World War came, everyone felt that he should grow as much food as possible to help out, so I undertook to get something out of these farms.

I was already familiar with soil analysis and so I built a small laboratory where I could make adequate soil tests to get my land in good shape. Catskill soils are of a good type. They usually have ample organic matter in them and can be very productive when properly fertilized. Naturally I found these soils exhausted of phosphoric acid and potash after being farmed for one hundred years with no fertilizers added. There was no boron in these soils, but the other required trace minerals were present in adequate amounts. The soil acidity was generally about 6.0 to 6.2 pH. In the pH chemical notation for acidity or alkalinity, pH 7.0 is neutral, and numbers less than 7.0 indicate acidity and numbers more than 7.0, alkalinity. If 6.5 is regarded as the desirable point for farm soils, I felt that mine were not bad and only needed a small amount of lime to make them right. One day, however, I tested a field which I had tested the week before and found the pH was 4.5.

Days from Seventy-Five to Ninety

It had been raining hard and the ground was soaked. In a week, I tested this soil again and found it was again pH 6.2. I wrote to New Brunswick and Cornell for information about this phenomenon, but received no useful explanation. I knew that soil must not vary in this way to be fertile. If it does, beneficial soil bacteria will be killed out and little nitrogen will be set free by them for plant use from the nitrogen locked up in the soil organic matter. After considerable study, I found that these acidity changes were due to a type of organic matter in the soil which sets free acids when very wet, and not when the soil held an ordinary amount of water. It took ten tons of limestone to the acre before this field would hold a steady pH of 6.5 when both wet and dry. It is now one of my best fields.

After my land was properly fertilized and brought to the point where I expected it to be fertile, I found that it would only grow about two tons of hay to the acre at most. This was too little for profit. I knew, of course, that this yield was due to too little nitrogen in the land. I added nitrogen fertilizers and did get some fields up to three tons to the acre, but I did not succeed in getting hay with increased protein content which I had to have for good cattle feed. It was only 8 per cent to 9 per cent at most in the best hay. I then studied all the available literature on the subject to find out if there was any known way to grow really good grass hay.

When 150 pounds of nitrogen per acre are added in the spring, the hay crop may be increased as much as a ton per acre, but the protein is no higher. When 400 pounds of nitrogen are used the hay protein is increased, but this much nitrogen is far too expensive. It was also known that if nitrogen is added to hay about half grown, the protein increases rapidly

Increasing the Feeding Value of Hay

for about ten days and then decreases fast. I tried this and found that 9 per cent hay would have 13 per cent protein in about ten days, but then it dropped so rapidly that it was often not possible to get it cut before it reached the original point again. This was not a practical method in itself.

Reading Waksman's *Soil Microbiology* cleared up what happened to nitrogen applied to hay in the spring. Soil bacteria were so stimulated and increased in number so rapidly that they consumed most of the nitrogen before the hay roots could get it. The hay only got from 20 per cent to 30 per cent of it.

When 400 pounds were used, the soil bacteria could only consume as much as they had carbohydrates to balance it, so this left more for the hay. Thus a means must be found to outwit the soil bacteria and allow the hay to get more of the nitrogen applied. As far as I could determine, no one had studied the protein content of hay roots to see what happened there. (Hay is different from other farm plants for it has an extensive root system that remains in the soil from year to year. Other farm plants must grow their roots each year from the seed.)

I found that when hay was cut, the roots contained about 3 per cent to 3 ½ per cent protein in most fields, but they could hold 9 per cent to 10 per cent. If I could apply some form of nitrogen to be absorbed rapidly by the hay roots and fully stock them up, the soil bacteria could no longer get any of this nitrogen. It would then become available in the spring for rapid hay growth. Urea gave me the best and most rapidly absorbed form of nitrogen. When the soil was damp after hay cutting, I found that the protein in hay roots would increase as much as 5 per cent in two weeks from the applied urea. Analyses showed that in this way the soil bacteria got 40 per

Days from Seventy-Five to Ninety

cent of the nitrogen, and the hay roots 60 per cent. Here was the answer to growing high-protein hay economically.

I now use about 36 pounds of nitrogen, in the form of urea, in early October when the soil is damp, and no nitrogen in the spring. Hay grows with great rapidity in early spring, and before the timothy heads come out of the sheath I add 72 more pounds of nitrogen. This raises the hay protein from about 13 per cent, which it usually contains, to 20 per cent to 25 per cent. It drops, in my highly fertilized soil, at the rate of about half of 1 per cent a day, so I have time to get the hay cut and dried at a protein content of from 18 per cent to 20 per cent, or more.

As the proteins in hay and grain feeds are composed of the same basic building blocks of amino acids, there is no reason why hay proteins will not furnish the same food for milk production as grain feeds. But the twenty-five pounds of hay a cow must eat daily must contain enough proteins to do this, which means about 20 per cent to 25 per cent protein in the hay. Such hay has never been available for cattle feeding and this is why agronomists do not believe that hay alone can give a high milk yield. Personally, I am confident that it will, and that cattle so fed will have a longer milking life than those fed hay with supplementary grain feeds.

I was recently informed by my farmer that two of my neighbors, who bought my hay last summer, fed it during the winter. When it ran out and they fed their own hay, they found the milk yield dropped at once and could not be entirely restored by grain feeding. They were very disappointed to find that I had no more hay for sale. These results would have been even more marked if this hay had contained more protein. It held only from 13 per cent to 14 per cent.

Increasing the Feeding Value of Hay

If this works out as well as I expect it will, then a farmer with twenty head of cattle will end the year with from two thousand to two thousand five hundred dollars more than he would have had if he grain-fed his cattle. This is because the proteins in hay cost less than half as much as those in grain feeds. If this revolution in dairying takes place, as I expect it will, the grain growers of the West will lose one of their big markets. But this cannot be helped. The present method of feeding cattle for milk is wrong and uneconomical.

I hope to continue this study of high-protein hay with more analytical work to improve my method. I will have over 250 tons of high-protein hay for sale this season. I will charge twenty-five dollars per ton for 8 per cent protein hay, and one dollar a ton for each additional per cent of protein in the hay. Hay has never been sold on its protein content before and it will take some time to introduce this new practice, but it is highly approved of by the United States Department of Agriculture. There is no reason why hay should not be sold on an analyzed protein basis. Law requires it of all other cattle foods.

Talking about milk production naturally brings up the subject of cattle breeding for high milk output and the laws which govern the increase or decrease of special characteristics in animal breeding. Few people seem to understand the fundamental laws of this subject, and I will digress a moment to make them clear.

Sex-linked characteristics are transmitted through the opposite sex. Thus, milk yield, being a female characteristic, is transmitted through the bull and not the cow. Even rather low-grade cows can have high milking calves when mated to a bull transmitting the high milk character. In the same way,

Days from Seventy-Five to Ninety

egg laying is transmitted through the cock, and not the hen. For over fifty years, high-laying hens were selected for breeding and only increased the average egg laying about 5 per cent. When they bred from cocks which had shown high egg-laying capacity in their offspring, the average egg laying per year was increased over 50 per cent in ten years.

When the desired characteristic is not one belonging particularly to sex, it is transmitted equally through both sexes. For instance, speed in horses is as useful for survival in both sexes and is therefore transmitted equally through both the mare and the stallion. The same is true of the capacity to gain weight on less food, a marked characteristic in beef cattle. To get the best breeding results, both male and female must be well selected. We know, however, that speed for instance may be the dominant character that an individual animal can transmit. The stud book of race horses has many instances of certain stallions who transmitted the characteristic of speed better than other horses who ran equally well. We must not, therefore, only select the individual for breeding with the characteristic we want to reproduce; it is also necessary to obtain an animal in whom this characteristic is dominant in transmission. Here is where the skill in breeding, and the success in it, lies, and where the time element can be shortened.

In human beings, the inheritance is so mixed at present that we get reversions to a previous type in unexpected ways. However, if both the father and the mother come of able stock for a number of generations, the offspring, on the average, will be far superior to that of ordinary people, except for sports as they happen to occur. We can see historically how, after the fall of the Roman Empire and during the Middle Ages, small groups of people formed in order to have protec-

Increasing the Feeding Value of Hay

tion to survive. These groups were led by those who had the greatest physical vigor and ability and these families became the ruling aristocracy of Europe. They intermarried and continued to produce superior individuals who were capable of leading. From this came the respect which most Europeans still have today for the aristocracy. When these families came to intermarry more for the acquisition of estates than for physical vigor and stamina, the aristocracy largely deteriorated to the common level, or often even below, as was the case with the Bourbons.

One of the best instances of the inheritance of mental ability is that of the families of Darwin, Wedgewood, and Galton which intermarried so frequently, producing, finally, Charles Darwin. He was one of the world's outstanding intellects, despite the fact that he was a hypochondriac. Young people ought to look to the stock they intend to become connected with, but they rarely do.

My own family came from people of ordinary social status but they were all, so far as I can find out, of more than average ability and character on all sides. One of the ancestors must have had a mathematical bent because this crops out now in every generation of the family, and has for four generations. Among my own children and grandchildren there are four of exceptional mathematical talent. There is also an inventive strain which comes out frequently in each generation.

Perhaps it is because our people move about so much in this country and do not breed continuously from settled strains that we do not produce either literary, scientific, or musical people of the very first rank. We do breed many of the second grade and the average ability here is probably as high as any-

Days from Seventy-Five to Ninety

where. I have often thought about this phenomenon and the foregoing is the only explanation I have arrived at.

Garden

WHEN I VISITED LOUIS BROMFIELD AT MALABAR FARM A FEW years ago, he showed me his garden and told me that after he had fertilized it properly with all the trace minerals, as well as the regular fertilizers and manure, he found that there were no more insects on the plants, and very few plant diseases; and that he never had to use any sprays. I asked him just what he had done as to amounts of the various mineral elements per acre, and how much organic matter was present and what its character was. He did not know, and never had made any accurate analyses to find out.

When I returned home I thought I would try this plan out and see if it worked. Not having any accurate information from him, I had to figure out the amounts per acre of the various mineral elements which would produce optimum results in a garden. To do this I looked up all the information I could get, and then decided on what I should do and ordered various things I would need. I first made a most elaborate analysis of the garden soil as it was, embodying every mineral I could hear of which was known to be useful to plants. I then arranged to supply what was needed to bring the soil up to the required condition. The organic matter in my garden was already high, being about 9 per cent, and it had enough humus soluble in 4 per cent ammonia to be fertile. The pH made was 6.5.

The following spring the garden was planted as usual, and

Garden

when the plants were well up I looked for insects and found just the same number as always. I made up my mind that Bromfield was just telling me a tale. The following season I again looked for insects and to my surprise there were almost none. No cabbage worms, no bean beetles, and no potato bugs, at least only four on 360 feet of potato rows. The last three years, now, there have been practically no insects in my garden at all. But does it grow weeds! The only explanation I have been able to think of for these results is that when conditions of the soil are just right, enough antibiotics are produced to come up through the plants and kill or repel insects. I have no positive proof of this explanation, but the fact that it took a full year before changes took place would seem to indicate that time was required for the production of some toxic material. Anyway, I have no more trouble with insects and that satisfies me.

For those who might want to experiment along these lines, I will give the complete analysis of the soil in the garden which grew plants having no insects.

Soil was a sandy loam containing 5 per cent clay derived from slate rock containing some sand.

Total organic matter—10.05 per cent.

Humus soluble in 4 per cent ammonia after treatment with 1 per cent hydrochloric acid—2.9 per cent.

Water-holding capacity—59 per cent of the soil weight.

Acidity pH 6.6—determined by boiling 5 grams of soil with 50 grams water for one hour.

Total combined nitrogen—.336 per cent equal to 6,020 pounds per acre.

Potassium—481 pounds per acre.

Magnesium—70 pounds per acre.

Days from Seventy-Five to Ninety

Manganese—90 pounds per acre—soil extracted with normal ammonium acetate 20 ml. containing .2 grams hydrochinon.

Zinc—66 pounds per acre.

Copper—35 pounds per acre.

Boron—12 pounds per acre equivalent to 136 pounds of borax.

Molybdenum—1.2 pounds per acre.

Cobalt—2 pounds per acre.

I do not know whether it was the combination of all these elements which produced the results on the insects, or whether it may have been some one element which had this effect. The only way to settle that question would be to make plots, each one with one of the elements missing, and cultivate them for two years. This would involve about a dozen plots and I am not equipped to do this at the present time.

Trout Raising

MY CATSKILL PROPERTY HAD ABOUT FOUR MILES OF THE Neversink River running through it. This stretch was particularly good for protection because there is no public road in my valley. The Neversink is one of our very best trout streams naturally, because of the purity of its water and the fact that it lies about fourteen hundred feet above sea level, which insures the water being cool enough for trout all summer in the hot weather.

I wanted very much to have the best possible trout fishing for myself and my friends. I was already familiar with trout hatching and rearing. My brother Cooper and I had done this as young men at our family place at Ringwood. I found a

Trout Raising

spring which gave me only about thirty gallons of water a minute, but I made this do to supply my hatchery. I dug out many pools and ponds, covered them with wire netting to keep out the predatory birds, and was able to raise large numbers of fine trout. These were used for stocking the river. I tried endless experiments in trout stocking so that I felt I knew more about it than most professionals. I wrote a small book about my methods. After a few years I did succeed in producing the finest trout fishing I have ever seen in this country.

At the end of the season, I myself caught out most of the large fish, from two to five pounds, and placed them in my rearing pools. I fed them for the purpose of getting eggs for the hatchery. In the spring I again put them in the river. I rarely lost more than one or two of these large fish, and generally got about two hundred each year. Some of these big fish were marked and we caught them several times each.

I imported the eggs of the Norwegian Blege, a landlocked type of small salmon which lives all the year in swift water. They were successfully grown to about a pound weight. I had about two thousand ready to put in the river, when my hatchery was robbed at night and all these fish stolen. I did however put out a few, perhaps fifty, and last year three of these fish were caught on flies. There is a chance that they may become established in the Neversink. If so, we will have the only Blege fishing outside Norway.

In recent years I have brought over from Scotland ten thousand Atlantic Salmon eggs. I had them hatched in the State hatchery and the parr put in the river. It is my hope that these salmon will live in the new Neversink Reservoir, which is thirteen hundred acres and sixty feet deep, and will not go to sea. The outlet is sixty feet down, near the bottom. If these

Days from Seventy-Five to Ninety

fish do well, we might have fishing for small salmon, up to five pounds, in a few years. I am doing this entirely for others as my fishing days are about over. Still I want to see good fishing, if I can make it. I still have almost two miles of river on my property, above the reservoir, and we have put in several dams to make better pools. We do have good fishing there now for the members of the club I organized.

I did all this hatchery and stocking work after I was seventy.

Japanese Saki Deer

ABOUT FIVE YEARS AGO I ENCLOSED ABOUT TEN ACRES OF WOODLAND, which had a spring, as a deer park, and got four does and a buck from the Catskill Game Farm. These were Japanese deer, not the American white-tailed deer. These Japanese deer have a heavier saddle than our American, and the meat is much more tender. The fawns, when about six months old, have the finest meat I have ever seen. This deer park was made as an experiment to see if our wild woodland could be made to yield anything besides timber. As these Saki deer are not game animals, they can be killed and sold at any time of the year. The fawns can also be sold, and will weigh about thirty to fifty pounds at the first of the year. They can easily be sold for from \$1.00 to \$1.50 per pound. If one fawn could be produced from two acres of woodland each year, this would give a good yield from the wild land. I find that five deer keep the feed down too much on ten acres and I have to give them some hay to keep them fat. I rather think that it will take about four acres for a fawn each year. Of course any extra bucks are

Salmon Fishing in Ireland

also sold, but since they only bring eighty cents a pound, the main crop is expected to be the fawns.

The only trouble we have had so far is from wildcats which kill the fawns. We have lost two this way. It is not hard to trap all the wildcats, but then our fine house cat would also be a victim, so I have to set the traps far off and don't get all the wild ones. It looks to me as if wild woodland, properly fenced and the cats kept out, would yield about ten dollars an acre per year from the fawns. The Saki deer will browse just as our deer do, but they will also graze on pasture and eat hay, as our deer will not do. They could be made into a good crop on wild land.

Salmon Fishing in Ireland

MY OLD FRIEND MILES FLYNN AT THE ANGLERS CLUB WAS THE son of the water keeper at Carysville on the Black Water in Ireland. He told me in 1948 that this stream was a wonderful salmon river which had been injured in the past by a killing weir near the mouth, where they took most of the run of fish. This weir had now been removed and he felt the river would be full of salmon. If we could get the Carysville water to fish, we would have a wonderful time. He could arrange accommodations for us in a fine cottage on the river not far from Carysville, and I decided to go. The two other Anglers Club members who also agreed to go had to back out, but I got Mrs. Abbott Ingalls and her daughter to go with me.

We flew over to Shannon Airport. I had never flown the ocean before, but wanted to because when I was working with Sir Hiram Maxim on his aeroplane in 1888 and 1889, Lord

Days from Seventy-Five to Ninety

Kelvin visited us and spent some time figuring over the aeroplane data we had secured. He told me he wanted to prophesy that, since the main problems of flight were now solved, theoretically, if I were to live as old as he was then (about seventy-five), I would be able to breakfast in New York and dine in London. This was fifteen years before the Wrights flew. A friend of mine actually did this that year, but our party only flew to Shannon; we could easily have gone on to London and fulfilled his prophecy of sixty years before. I was eighty-two on this trip.

The Carysville Black Water is very fine salmon water in every way, but the water itself is dark-colored from the peat bogs at the head of the river. I never saw as many salmon in any river in my life. I counted as many as thirty large fish breaking water at one time, in three pools. Although we did succeed in getting about a dozen salmon, the fly fishing was very difficult and the fish would not rise. I would have taken more perhaps, if I had not given all the good water to Mrs. Ingalls and her daughter, who at that time were not skilled in salmon fishing.

I had some good fun with one fish which astonished Flynn. This fish took the fly at the outflow of a big pool under the falls and promptly turned and went down out of the pool through a smaller run about 100 feet long, then over a rapid to another long pool about 600 feet long. Flynn called to me to run and get below the fish, but I just stood still and fed him line. On my salmon reel I have about eight hundred feet of backing which floats on top of the water. When the fish had about six hundred feet of line out, I fed him line off the reel faster than he was going downstream. This made a pull on the fish downstream, which caused him to turn away from it,

Salmon Fishing in Ireland

upstream. He came back slowly while I reeled up the loose line, keeping slack below him. I could see him come up over the lower rapids and then over the upper rapid, right back to the pool where he started. I then called to Flynn to go out and gaff him, which he did skillfully. This fish weighed about sixteen pounds. Flynn called out, "It never was done in Ireland before. I have seen it done and I can't believe it." This is an old trick of mine which is fun to carry out. With my fine backing, I rarely loose a salmon this way.

I was most interested to find out why so many salmon would not take the fly well, so I tested the acidity of the water with my meter. I found that the usual acidity of the river was about pH 7.2, which is just alkaline. When there is rain at the head waters, the water comes out very acid from the peat bogs at a pH of 4.5. This is enough to turn the river water acid to about pH 6.8 and makes the salmon rather sick. They can get used to this condition in a few days or a week, but then the peat water stops running and the river changes again. The fish then have to get used to that condition, so they are continually disturbed and restless. When there happens to be a long steady spell of good weather without rain, the salmon will then take well, and there is wonderful fishing. These conditions could all be readily changed by adding some limestone to the river when the peat water runs, but no Irishman will ever do anything like that. The Black Water could be the finest salmon fishing stream in the world if cared for properly. It carries many very large fish.

At the Carysville house I saw, in the hall, the head of an old Irish elk which had been dug out of a neighboring bog. The horns were nine feet two inches across the head as I

Days from Seventy-Five to Ninety

measured them. There could not have been many trees where this beast lived.

Mrs. Ingalls's father unfortunately died while we were there, and this broke up our fishing party. There are plenty of salmon in Irish waters, but most of these waters suffer from the periodic acidity from the peat water, so the fishing is very irregular after the early season. The peat water begins to run usually in late May or June.

Spain

ONE DAY, IN JANUARY, 1950, I WAS SEATED NEXT TO A DISTINGUISHED foreigner at the Anglers Club table. I soon found that he was the head of the Tourist Department of Spain and we fell into conversation about salmon rivers and salmon fishing. When he rose to go he said that he had been much impressed with my knowledge of salmon fishing and that Spain, in order to attract more tourist travel, was most eager to make good fishing in the rivers of northern Spain along the Biscay Coast. He said he would write General Franco and suggest that he should get me to go to Spain, survey these rivers, and advise them of what was best to do.

I thought no more of the matter until one day a letter from General Franco arrived, asking me to come to Spain at his expense and visit the Spanish rivers. I replied that I was eighty-five years old and, although perfectly well, did not feel that I should travel alone in a foreign country. But if he would allow my friends, Dr. and Mrs. L. W. Gorham, to travel with me, I would be glad to come. He replied that he would be glad to have the Gorhams and pay their expenses also. I agreed to go, of course, and we reached Madrid by plane May fifth.

Spain

I was much impressed by the aeroplane flight. I talked with the captain and sat beside him in the co-pilot's seat for a time. Just as we were coming into Lisbon, I asked him how much fuel he used. He looked at his gauges and said he had used 3,000 gallons for 3,000 miles of flight, with 40,000 load pounds. This is a most remarkable achievement in efficiency.

Mr. Borrell, the head of the Fish and Game Department of Spain, met us and said he would accompany us on our trip north. The next day he told me that General Franco had just decided to go salmon fishing himself, for ten days, and our trip would have to be delayed. However, he had arranged an extended auto trip through the south of Spain for us to occupy our time. We visited Cordova, Toledo, Seville, and then Granada, where we were entertained in the Hotel San Francisco. This had originally been part of the Alhambra, but had been made over into a most delightful place with modern conveniences, yet keeping all the old air. One got a good idea from it of an ancient palace. The Alhambra has a most wonderful situation on a side hill overlooking the Granada plain, which is all irrigated. Its gardens extend up the side hill in three main terraces and are beautifully kept in the old Moorish style. The castle itself was never injured by war, as the Moors ran away after their defeat in battle and did not defend it. It has suffered only from neglect. Lately it has been extremely well repaired, and it is now one of the finest sights in Europe. It was full moon when we were there, and I arranged for the guardian to take us through the place at midnight. It was eerie and romantic going through the dark passages by lantern light, and then suddenly coming out into those wonderful courts in full moonlight. If anyone happens to be in Granada during a full

Days from Seventy-Five to Ninety

moon, I can recommend this visit. It is one of the most worthwhile things I have done in Europe.

Leaving Granada, we went down to the coast at Malaga, passing through some of the roughest mountain scenery I have seen. I wondered how the armies of Ferdinand and Isabella, since they came this way, ever got through these passes. In Malaga, the Tourist Department has fitted up another old Moorish castle, on a hill outside the town. It has a wonderful view of the town and bay, and for the two hours we were at lunch, we saw no movement in the town or harbor. The siesta is certainly strictly observed.

From Malaga we went along the coast to Gibraltar. The road is somewhat similar to the Corniche road along the southern French coast and the Italian coast beyond Monaco. We could not go to Gibraltar because special passports are required and there was not time to get them. The hotel at Algeciras, opposite Gibraltar, is of the old-fashioned Spanish type. When I went to my room, I found that there was no water flowing in the bathroom. I called the manager and he sent his engineer to fix it. He worked on it a while and then stood up saying, "The water used to run here." He then disappeared never to return. By pounding the pipes, and working at it, I finally got some water. It was rusted shut.

At Jerez we had a chance to see a town fiesta, with girls riding pillion behind the men—something I had never seen except in pictures. The elegance of the ladies' dresses seemed to be measured by the number of flounces they had, one above the other. All wore flowers in their hair. The whole scene was as gay as possible.

There was one incident at the bullfight which amused me. A boy of about fifteen jumped over the barrier and seized one

Spain

of the red capes and teased the bull to charge, just as the matadors do. He did it just as well as the professionals and the crowd cheered. Since he was stealing the whole show, the police had to come in and chase him out.

When we got back to Madrid, General Franco had just returned. This meant we could start out the next day. It is about a four-hundred-mile auto trip to the north coast, but we had time to stop at Burgos and see the cathedral. It is a far better building than the other Spanish cathedrals, because it was designed by a good German architect. Native Spanish architecture has little to recommend it.

We went all along the north coast, down to the Portuguese border, and looked at sixteen salmon rivers. These rise in high mountains which in most places are from twelve to twenty miles back from the coast. In the hills the streams are so rough they could not be poached. Here a few early-run salmon always get up where they cannot be caught. The stock is thus preserved. Between the mountains and the sea, the land is undulating, and the rivers have wonderful pools for fish. I found that these Spanish rivers were better salmon rivers naturally than any in Ireland, Norway, England, or Scotland with which I was familiar. This is because they do not get below freezing in winter, and the parr have a chance to grow well all the year. I found that the five-year-old fish, returning from the sea, were about eighteen pounds, as against fifteen pounds for those of other countries.

There are no enemies to salmon in Spain—no crawfish to eat the eggs, no predatory birds that I heard of, no seals along the coast, and netting is no longer permitted. The salmon therefore have the best possible chance to survive in the four rivers, which Borrell has policed so well. He has most excellent

Days from Seventy-Five to Ninety

records of all the salmon taken in any way. I found that they get a return from the sea of three adult fish for every spawning fish, which is as good a result as anywhere. Five years before, they had had only three hundred fish spawning in the Deva River; on the fifth year they took one thousand salmon by fishing. The year I visited Spain there were three thousand fish spawning, which meant that in the five years that followed they should have taken nine thousand fish. I have not heard if that came about, but it should have occurred. They could easily take forty thousand salmon a year from the four rivers now protected.

Borrell made one serious mistake when he laid out his plans. He divided all the fishing into fishing beats, enough for a day's fishing. He then assigned half the beats to the natives and reserved half for visiting sportsmen. This worked well the first years, but then the natives found they could make more money fishing than they could farming; so they all fished. There have been as many as sixty fishermen on one pool, using all kinds of bait and lures. This intense fishing so scared the salmon that they no longer take a fly in the sportsmen's waters. Therefore, the sportsman has poor fishing. Borrell has asked General Franco to stop bait fishing on May first and allow fly fishing only. I fear that even intense fly fishing will scare the fish and there will never be good fly fishing again. It may be that they will preserve other rivers under different regulations, which would result in good fly fishing. But in the four rivers the custom has been established and to change the rules would cause political trouble.

It is doubtful that there will ever be the fine fly fishing there could be in these rivers as long as the natives fish them so intensely. Of course, these are their rivers, and they would not

Spain

get as much from them from sportsmen as from the natives' taking more fish. Perhaps the government will set aside one river solely for sportsmen fly fishing. If they do, they could have the best salmon river anywhere because the water never gets warmer than 60° F. and is never too warm for good fly fishing. They could have a season from April first to September first, all good fishing.

Dr. Gorham and I agreed that Spain is now a wonderfully well-governed country. Life and property are much safer there than in the United States. Crimes of violence are almost unknown, now. Typhoid has been eradicated and one can drink the water anywhere in Spain. Fine tuberculosis hospitals have been built in the hills. The roads, which were wrecked by the civil war, are now in fine condition. We went twenty-eight hundred miles over them and found only one rough place. Without any help Franco has brought Spain to a self-supporting economy, where there is enough food and clothing, and little beggary. The Spanish people are poor, as they have always been, but Spain is potentially a rich country when developed. It has all the minerals—iron, coal, lead, zinc, copper, mercury, and silver. Its lands along the coasts, because they get ample rain, are fertile, but the central part within the surrounding mountains gets scanty rainfall, like our Nevada. The land is well mineralized, and if water that now flows into the sea from the mountains could be brought back to the central part, it could be irrigated and produce ample crops. Spain then could be an exporter of foods. At present they do not have the capital to do this irrigation work, except slowly. In the central parts, they now grow only a crop of wheat every two years and they get only about sixteen bushels to the acre. They could get thirty to forty bushels every year with irrigation.

Days from Seventy-Five to Ninety

Along the northern coast I saw a type of farming I have not seen so well done anywhere else. They have cattle on all farms and, to keep off the flies, keep them in darkened cellars all the time. Fresh grass is brought in for them every day and, in addition, they put in any organic matter they can find, such as leaves, ferns, and dead grass. This is all trodden down into a wonderful compost which is put in the fields three times a year, as they raise three crops a year. This has been done for centuries, possibly since Roman times as this method of agriculture was known to the Romans. The result is their soils are so high in organic matter that there is no erosion at all. I saw land cultivated at an angle of forty-five degrees with no gullies in it, although it had been raining hard for ten days. Long years of farming without the addition of any mineral fertilizers has reduced the potassium and phosphoric acid to a point lower than it should be for good crops, but they still get about half what could be grown. The man we stayed with told me that when he could get any fertilizer, his crops increased greatly. General Franco is now erecting some large fertilizer plants. This Basque country of Spain has the best climate I have ever seen anywhere, and if they can get fertilizers, it will be a very rich agricultural region. The people are wonderfully hard workers and only need a fair chance to become prosperous. They are fine people.

We owe a great debt of gratitude to General Franco. When the civil war ended, Hitler arranged to meet General Franco at the Pyrenees. He told Franco he intended to cross Spain, take Gibraltar and all of North Africa and Egypt, and that he had six hundred thousand troops he could easily do it with. General Franco told Hitler that he could probably get to Gibraltar, but that he could never supply his troops because

Carpentry, Machine Work, and Laboratory

there were seven mountain ranges to cross between the north and south of Spain, and the Spaniards would cut all his supply trains to pieces. The first German troops to enter Spain would start the war. Hitler gave up his plans and invaded North Africa through Italy. If he had taken Gibraltar and blocked the Mediterranean, we probably never could have driven him out of Africa and would have lost the war. As it was, a very severe campaign was necessary to recover Africa and to prevent his taking Egypt. General Franco really saved the Second World War for our side by his action in blocking Hitler. We ought to be grateful to him.

Borrell told me that General Franco told him that a limited monarchy was the best government for Spain, and that he intended to place the young Prince Juan on the throne if he showed good brains and character. He is now being educated to be king. His father has proved dissipated and impossible. General Franco says he is very tired and would like to retire as soon as he can assure a good government for Spain.

This Spanish trip gave me great pleasure. I did not find it too tiresome at eighty-five and came home in excellent health.

Carpentry, Machine Work, and Laboratory

I HAVE A RATHER COMPLETE WOODWORKING SHOP IN THE ATTIC of my house in Gramercy Park and have spent much time making furniture during the last fifteen years. My grandfather, Peter Cooper, had me trained as a skilled woodworker and I have never lost the taste for it.

I designed and worked out a new type of tea table, which I consider an improvement on any I have seen. The bottom

Days from Seventy-Five to Ninety

supporting frame is made of wild cherry, from my farm, which turns such a nice reddish color. The bottom supporting base is made heavy, with a good cross piece to act as a footstool. Everyone puts his feet on such a base so there is no reason why it should not be a good footstool. I covered the top of the frame with glued-on felt. The top is fastened onto this felted frame. The top is a three-piece design with a center section and two drop wings. When these are raised, the whole top is rotated 90 degrees on a central shaft. The table frame then acts as a solid support. The felt covering, which is impregnated with talcum powder, makes it easy to turn the top. When the top is completely rotated to a stop, the drop leaves are secured in the top of the table frame by metal pieces which engage in slots. In this way, the table is made absolutely solid and secure. No one can hit one of the supports to let the wings down and dump all the tea things on the floor, as so often occurs. I make the tops of the various hardwoods I can get: black walnut, African white mahogany, maple, curly birch, Australian lacewood, or Indian rosewood. All my tables are different. I have made twenty-five of them in the last fifteen years and have given one to each of my children and married grandchildren. I also have four in my New York house for our use, and four in the country. I have made several for intimate friends, too.

I believe I am about through making tables, but there are signs of another marriage, so I may have to make more. I finish the tops with a varnish rubbed down smooth, which is not affected by water or alcohol. These tables are much admired and there are many requests for them. I have tried to get them made commercially so others could have them. So far no one is willing to make them because they say the cost would

Carpentry, Machine Work, and Laboratory

be too much to sell them at any reasonably commercial price. It takes me seventy hours to make one by hand.

I have also designed and made several wood racks for firewood. I did not know of any which were really satisfactory into which one could dump a whole armload of heavy wood. The four uprights are made of wild cherry from my farm, and the lower part is bolted together with $\frac{3}{8}$ -inch steel bolts so that it can never come apart. These racks are very good-looking and we find them most useful.

I have also made a number of footstools copied from those once used in England called "gout stools." They were intended as a rest for gouty feet and are most useful. There are various other pieces of furniture about my two houses which I have made at different times.

In my machine shop, I have made about twenty fishing reels of my own design. I could not find any which I felt were made as well as they should have been, or were really durable and reliable. These reels have proved most satisfactory in use. I have made and given them to my friends who prize them greatly.

I have also made and repaired musical instruments, and have all the tools necessary for this kind of work. However, since I injured my hands, I can no longer play stringed instruments, so I no longer do any of this kind of work. I still have my collection of musical instruments in my parlor; most of them I have repaired and many of them I have played.

In my collection is a viola da gamba which has the finest tone I have ever heard in any stringed instrument, even a Stradivarius. I got this in an unusual way. My brother and I were walking in Paris and came to the old fish market down by the Bastille site. It was here I spotted two instruments hang-

Days from Seventy-Five to Ninety

ing up at the back of a butcher shop. We went in and I asked if they might be for sale. The man said yes, that he had just received them from his sister in Avignon and they were to be sold for her. One was the da gamba made in Mantua in 1720, and the other, which was played with it, a viola d'amore. I purchased the two for eight hundred francs, or one hundred and sixty dollars of our money, at that time. John Friedrich, the violin repairer who put these in order for me, told me that they were the best-toned instruments he had ever repaired. Cassini, the celebrated cellist, used to come to my house often to play this gamba. He tried to get it from me in every way he could.

I have half a dozen old lutes, several old guitars, many cithers, and other stringed instruments. I wanted, at one time, to have a really good violin to go with our other good instruments. I knew Mr. Colton of Brooklyn had the reputation of having made the finest violins of our time. In fact, Ole Bull thought so much of them that he left Colton his fine Guarnerius in his will. Mr. Colton agreed to make me a good violin, but said it would take three years to do it. When this violin was finished, we had a party of musicians for it. The Guarnerius and the Colton violin were played, one after the other, in the dining room, while the music jury sat in the parlor where they could not see the performer. The verdict was that the Colton instrument was the better and the more powerful of the two. I later took both of them to the laboratories of the New York Telephone Company, where they have a delicate analyzer that gives all the tones and overtones of sound. The two were compared, and the Colton was fully as good as the fine Guarnerius.

It is all nonsense that only old Italian instruments can be of

Carpentry, Machine Work, and Laboratory

the first class. George Gemunder made two violins which he sent to the International Exhibition in Vienna one year. They were returned to him with a note from the jury saying that he could not get the prize because he had sent two old Stradivarius violins with his own name in them. We can make instruments today just as good as those made formerly, but no one will pay the price which such work entails, or wait years to have them made. A really fine violin could not be made today for less than two thousand to three thousand dollars. No one would pay that for a modern instrument so none are made at present.

I have one interesting part of an instrument which I found in a junk shop in Paris. It is the neck of an old arch lute, handsomely inlaid in ivory and ebony. The bowl of the instrument is broken off at the end of the neck. On a piece of the remaining sound board there is stamped in large letters, M.S., the mark of Matteo Sellas, lute maker to the Doge of Venice when Columbus discovered America. This lute was smashed during the Paris Commune. The mate to it is now in the Conservatory Museum at Paris.

I made a small lute, for my own playing, with a neck the right length for modern concert pitch. The old instruments were made for a lower pitch. I made the bowl of alternate strips of spruce and ivory with the outside nicely grooved, so that the bowl would not turn against my body. In order to secure the maximum noise from it, I made the center brace below the sounding board of a truss construction in place of a single piece of wood. This very light brace greatly increased the volume of sound from the instrument. This was the finest small instrument I have ever heard, and the one with the most power.

Days from Seventy-Five to Ninety

I played it for many years, often with orchestra, and it held its own.

I only wish I could do instrument playing now, but that is all over for me. I miss it greatly.

Distilled Liquors

I DO NOT REMEMBER WHAT STARTED ME OFF ON THIS LINE OF investigation but I did make a very extensive study of the subject. I tried to find some way in which distilled liquors could be made rapidly, of as good quality as those aged over long periods. I could see no reason why the chemical changes brought about by aging could not be made much faster than they are in a charred barrel. I found out what really takes place in the aging of liquors and then tried to duplicate these changes in a shorter time. The process I finally developed used exactly the same materials as the regular aging, but I found physical means of accelerating the process. In this way I could make the best of aged liquors in two to three weeks instead of five to ten years. The resulting product was exactly the same in taste, smell, and chemical constitution.

I thought I had made a valuable discovery, and got in touch with one of the largest distilling companies and told them what I could do. They asked me to go to their main laboratory in Ohio and demonstrate this process to their chief chemists. I did this and they were perfectly satisfied that I had solved the problem. But then came trouble. When they reported and discussed this with the executives of the company, they decided that such a process would have little or no value in their business because the government obliges them to state the age

Distilled Liquors

of the liquor on the label. The public is used to regarding age as a criterion of quality. It would take a long and expensive campaign of advertising to secure any large sales of a quickly made liquor, no matter how good it might be. Their present process is cheap enough, for they can keep liquor in bond without paying any tax on it until they want to sell it. The only cost is the interest on the liquor cost itself and on the storage space. There is no loss of alcohol in storage as it does not get through wood. However, they did not want competition to have this process so they made me a proposition. For a fee of ten thousand dollars, I was to take out no patents and would not disclose the process to anyone else. I accepted this arrangement and was well satisfied with my six months' laboratory work.

I have never done anything more in this line. The process is an absolutely perfect one, and cheap to operate. Liquors equal to the very best old aged ones, including Scotch, can be made in from two to three weeks. One might say that the process is now bottled up.

I had made the mistake inventors so often make in not first determining the value of the invention they propose, should it be successful. And, second, I had not determined whether there was a ready market for it, without the expenditure of much time and money to promote it. I have done this often myself losing sight of the fact that the real value of an invention lies not in itself but in its sale, especially in the rapidity with which a sale can be made to bring in some real return. I have known a number of good inventions that took many years to become profitable.

After the First World War we had an organization called "The Inventors Guild." Many of the leading inventors of the

Days from Seventy-Five to Ninety

time belonged, including Edison, Westinghouse, and others. One night, at a dinner of twenty-seven, the question was raised as to how long it had been before any of them had received any real money from any invention. The question went all around the table, and the earliest date mentioned by anyone was nine years. To paraphrase Gilbert and Sullivan, "The inventor's lot is not a happy one."

Book Mend

WE HAVE LARGE NUMBERS OF OLD BOOKS WHICH ARE IN BAD shape, so my daughter, Mrs. Stevenson, took lessons in book-binding. She found that the methods taught were so time-consuming and cumbersome that she would never be able to bind enough books to make it worth while. I gave this subject some thought and could see no reason why a better and more rapid way could not be devised. My idea was to secure a strong flexible glue which could hold the pages together without the tedious sewing of the signatures. If that could be done, the rest would be easy.

I retired to my laboratory and, after reading what I had on this subject, I went to work. It took me six months before I had what I wanted. I also found that if we covered the outside of books with any plastic resin varnish I could find, eventually it would peel off and injure the binding. This was due to the fact that all these plastic varnishes are made soft and flexible by a liquid plasticizer. This always has a vapor tension and slowly evaporates, and also migrates down into the book surface. I finally found that if I first covered the surfaces with my glue suitably diluted with water, and let it get thoroughly

Book Mend

dry, the plastic resin varnish would remain in perfect condition indefinitely. It proved to be a simple matter to make up the cover separately and then glue it to the book after the pages and back had been put solidly together. In this way, a book can be completely bound in an hour to an hour and a half of working time. This binding is superior to the ordinary type because it is waterproof, grease-proof, and will not mildew in dampness.

We were pleased with the results on old leather-bound books, where the leather had become rotten and powdery. When this old leather is impregnated with my glue, diluted, and then made stronger with another coat, the leather becomes strong again, even stronger than it was originally. When the glue is dry it is coated with the plastic varnish, which I furnish in either shiny or dull finish. The old books look like new, and are even stronger. Loose backs can easily be fastened on and made secure. The repair of old leather books is rapidly done and the results are most satisfactory.

We felt that this process, which was developed for our own use, would be very useful to others, so I made up a complete kit for this work and finally organized a partnership to put it on the market. I named this Hewitt Products and it operates from Liberty, New York. We have made quite extensive sales of these kits and have never had a complaint that they do not bind and repair books as we state.

My daughter has become deeply interested in promoting the use of these kits among old and invalid people who can do this work at their leisure in a small space, even in bed. Occupational therapy people have become much interested in this type of work for the incapacitated. It means patients can

Days from Seventy-Five to Ninety

earn some income at home, besides having the pleasure of doing something by themselves of real value.

It has given me much happiness to have developed this new process which is going to be of such use to so many ill people. I did all this work at the age of eighty-five and it shows that we do not have to stop being active and creative.

Materials for Artistic Work

I HAVE ALWAYS BEEN INTERESTED IN PAINTINGS AND WONDERED why those of the old Flemish school were so much more brilliant than many of those painted later. No one seems to have explained it, so I thought that I would try to find the secret.

The first step was to make linseed oil by the cold extraction process. I was certain they did not use hot-pressed linseed oil, for this yellows with age and becomes darker. None of the former is on sale at present, so far as I could find out, so I set up in my shop a grinding mill attached to the milling machine. I ground up flax seed and pressed it out in a screw press. The yield was small, only about 8 per cent of the weight of the seed, while pressing hot gave about 15 per cent. This explained why there was no cold-pressed linseed oil for sale. The cold-pressed oil was of pale color and did not turn dark or yellow in light, and it made a nice clear film when painted on glass. When observed through the microscope, this film has small porous holes which allow air to pass through. My son-in-law, Gordon Stevenson, who is one of the best portrait painters in this country, was delighted with this oil. He always uses it now.

However, I felt that this improvement was not the whole

Materials for Artistic Work

story. By accident, I ran across a book written in Cincinnati by Joseph Michelman. In it he detailed his work in the investigation of the varnish of the old Italian violins, to which he attributed their fine tone. This of course is sheer nonsense, for the varnish has little or no effect on the tone of any instrument. He finally succeeded in getting some scrapings from the varnish of a Stradivarius violin which was being repaired. He submitted them to spectroscopic analysis and found that the resin used was rosin, the basic gum of which is abietic acid. He also found considerable amounts of both silica and alumina which he could not account for in a varnish. Considerable work revealed that this varnish had been made by using the lye extract from hardwood ashes treated with lime, which will dissolve about $2\frac{1}{2}$ per cent of rosin. This solution was then precipitated with alum, giving a resin powder, when dry, which was an aluminum resinate of abietic acid. This was then dissolved in linseed oil to make the varnish. This production method accounted for the silica and alumina. He found that varnish made in this way corresponded exactly with that of the Stradivarius violin and he felt that he had then solved the problem. When I read this, I tried making such resinates and found that I could make an even better product by using potassium hydroxide and then precipitating with aluminum sulfate under the proper conditions. This resinate was found to be soluble in both turpentine and linseed oil. It can be incorporated into paint either in the oil or in the turpentine, as one chooses. Only a small amount is necessary to give the paint a more brilliant look and make it reflect more light. It also frees the paint film of those minute pores where air can penetrate. It further slows down the drying time of paint so that the artist can regulate just when he wants his painting dry. It

Days from Seventy-Five to Ninety

also enables him to paint over wet paint the following day without danger of a dry film on top. Gordon finds this a great convenience. I feel that his paintings now are far better and more durable than those he did before using this present method.

Gordon has not been satisfied with any of the varnishes he has used for paintings. I worked out an improved varnish for him which is perfectly colorless and waterproof, and will not turn yellow with age. It is easily applied and dries in an hour or so. It can be removed easily with a solvent without injuring the painting, if carefully done. This same type of varnish is now used at the Metropolitan Museum, but they use a more rapid-drying solvent than I do. I feel that my varnish is better.

Artists using pastels have complained that the fixatives they have to preserve their work have not been satisfactory so far. They change the colors of the pastels slightly, and often make them run. I studied this subject carefully and found that the solvents used were much too light and dried far too rapidly. Using a good resin plastic that is soft and flexible naturally and does not require any plasticizer, plus a solvent selected from a vast number tried, I made a fixative which has all the properties desired and works wonderfully well. It does not, in any way, change pastel colors. The Hewitt Products of Liberty, New York, now market this fixative. The reports we have had from artists using it are all enthusiastic, and they say it is just what they have always wanted.

Part III

Good Health in Life and Old Age

MARK TWAIN ONCE REMARKED THAT THE BEST WAY TO A RIPE healthy old age was "to acquire the habit of longevity in early youth." This clever wisecrack contains, however, a basic truth. Our length of life and good health in old age do depend largely on our inheritance. There always have been, and always will be, short- and long-lived families. But during the last two generations, the sciences of medicine, nutrition, and biochemistry have taught us many things which can prolong the life of the individual from fifteen to twenty years, provided, of course, that people use this knowledge.

But here lies the real difficulty. Most people will do what gives them pleasure at the time, regardless of the future, and no advice or knowledge seems to have much effect on them until they suffer bodily illness. Then they want a doctor to give them a pill or a miracle drug to make them well again, not realizing that they are sick because they have made themselves so. Generally, when their health improves, they go right on doing what made them sick before. This is particularly true of people who are overweight. They live for a time on a suitable diet and get themselves in good shape; then they stop the diet, resume their former way of life, and get their weight back. Few people have character enough to eat only the amount of food they should to keep their weight where it should be. Then they wonder why they are not well in their old age. I have strong sympathy for doctors who are called upon to care for such people.

Days from Seventy-Five to Ninety

Fortunately for me now, I was never well as a boy or a young man. I suffered from malaria for many years and never got rid of it entirely until I lived in Europe, where they don't have it. At thirty I developed a severe case of Bright's disease and was told that I had no more than two years to live, that my case would end fatally. This was a great shock and I resolved that I would do everything I could to get well. I did not want to end life then. I was treated by two of the best doctors of that time in New York, my own family doctor, Dr. Walter James, and Dr. Edward Keyes. My mother insisted on calling the latter in as he was reported to be the best man in this country for this disease. He treated me for a year with little or no improvement. Then Dr. James told me one day that they could not cure me, but that he felt that there was a chance that I might cure myself if I would do as he directed. He then told me that my case had arisen because I was one of those people who could not eliminate too much nitrogenous food through my kidneys. I had always eaten large amounts of beef, red meat, and eggs. My kidneys had finally broken down and the cells were allowing the blood serum to leak through, and I could not make this up fast enough. He said that the only way this could be helped was not by any medicines, but by as complete a rest of the kidneys as possible. He said no doctor could prescribe just what foods were bad for my particular kidneys, but that if I would make urine analyses every day in my laboratory and keep a diary of what, and how much, I ate and drank, and how I lived, that I would find that some foods made the kidneys worse and some did not. Whenever I found a food bad for me, I was to stop eating it; whenever I found one which did less damage, I was to eat that food. He gave me a list of what he thought

Good Health in Life and Old Age

would be good and bad for me, and the amounts I should eat and drink. I followed this advice most carefully and kept it up for fifteen years. I soon found that I could eat no beef at all, and no eggs. Alcohol, coffee, and tea were also bad for me. I never smoked. I could take milk, fish, poultry, and fresh vegetables, except peas and beans. After I had worked out a suitable diet and way of life, I began to get a little better, but not very much or fast enough. Dr. James then thought that the rest of the trouble lay in the fermentative products formed from the food in the intestines, which were poisoning the kidneys, since we could detect these in the urine.

He told me that there was an Indian remedy called podophyllin, derived from the May apple, which has the property, when taken in just the right amounts, of increasing the mucus on the walls of the intestinal tract. This slides the food through more rapidly, mechanically. He then gave me a bismuth meal and X-ray, which had just been discovered, and found the time was forty-eight hours. I then made up podophyllin pills in a whole series of strengths, and finally found just the right amount to take in order to make the food pass through more rapidly without making the bowels loose. This took some time, but when I had it done we took more bismuth meals and found that the food was passing through in eighteen hours. We also found the fermentative products shown in the urine had disappeared, and the kidneys began to recover. I was out of danger in a year, but it was a number of years before the kidneys were completely well. I have continued this practice continually for nearly sixty years. I find that the amounts of podophyllin have to be varied constantly, depending on where I am and how I am living. The dosage is quite different in summer than in winter. This is the trouble in this

Days from Seventy-Five to Ninety

type of treatment for other people, for they don't know how to regulate the dose and will not do it properly. It might be done under hospital care, but probably not otherwise. Anyway, it has effected a complete cure for me and my kidneys are today in perfectly normal condition. I take no chances and have them tested twice a year.

This study of my kidneys taught me the lesson that I did not have a body which could stand abnormal strains, so I must look after it all my life, as I have done. If I had not had this shock, I would no doubt have acted as everyone else does and gone along until I became ill.

From that time to this I have made a study of health and, being a chemist, have studied biochemistry to a considerable extent. I feel now that I know more along these lines than most doctors, although I have no medical degree. My studies on health have sound basis in scientific knowledge. I have five brothers and sisters who all died around seventy years of age, thus showing that my efforts toward good health have been successful. At ninety, I have blood pressure of 125 over 80 and there is no sign of any circulatory difficulties anywhere. The pulse in my ankle is as strong as in the wrist. I hear well enough, have my hair, and lost my first tooth from natural causes at eighty-five. I see well enough without glasses for outdoors but wear them to read. I cannot walk far any more since I get out of breath, although my heart is still strong and in perfect shape. I am not quite satisfied that they know the reason for this yet. I can go up and down stairs readily without puffing. Altogether I feel that I have done a good job of keeping my body well. I will now tell some of the things I have done to accomplish this, and what I feel others should do if they wish for good health in old age.

Good Health in Life and Old Age

IN 1913 I happened to be in Dr. Casimir Funk's laboratory. He had just discovered and isolated vitamin A, which was the first vitamin discovered. He gave me some to take. I believe I am the first person outside of his laboratory to have taken vitamins. As the studies of vitamins rapidly developed, I followed this work carefully and took them all as soon as they were available. Dr. Henry C. Sherman of Columbia published a paper in which he told of experiments he had tried with animals to which he gave regular diets and diets supplemented with ample vitamins. He found that the vitamin-fed animals had a 15 per cent longer life. My good friend, Dr. Murray Butler, gave me an introduction to Dr. Sherman and he told me of this work. I asked him if this would be true of human beings. He replied he saw no reason why this would not be so, but it would take forty years to find out. I said I would be the first person to try this. I have taken all the vitamins regarded as necessary, as they have been discovered from that time to this, without missing a day. I feel quite sure that this has added greatly to my health, but there is no way to prove this. I have found, however, that when ample vitamins are taken for more than a year continually, the common cold disappears. We rarely have colds any more in my own family. I have had three colds in twenty-five years, all from very severe exposures, and these only lasted for a few days of sniffles. Many of my friends have had the same thing take place when they take my multiple vitamins. One business firm in New York has given them to their thirty-five employees; as many as six to eight people used to be out at one time during the winter. When they can make their people take the vitamins regularly they have few colds, but it is hard to make them do it. I believe the multiple vitamins I made up were the first

Days from Seventy-Five to Ninety

complete set made, long before the medical profession approved of multiple vitamins at all. I made up the formula from the best information I could gather from all sources. I have not had reason to change the mixture. I have these made up for my family and friends, and have not tried to make a business of this. There are, at present, several formulas on the market which are excellent, so there is no reason for me to get into this business.

I have found out one or two other things about vitamins. I read of some experiments in which rats that were deprived of vitamin C, riboflavin, and vitamin A developed cataracts. When they were again supplied with these vitamins, the cataracts recovered. Mrs. Hewitt told me that her eyes were getting dimmer and she could not see too well. I had them examined and the doctor told me that she had the beginnings of cataracts. I figured out the amounts of vitamins she ought to have, according to the rat experiments, and gave them to her without her knowledge. In six weeks her eyes cleared up entirely and I had them tested again. The doctor said they were entirely cured and asked me what I had done for her. I told him and he then said, "We never give medicines for eyes, we only operate." I told him I had done what he ought to have known enough to do, and let him go. I have since found that vitamins will only cure cataracts when they first begin, for when the white material gets fixed in the vitreous lens, it cannot be reabsorbed. I found that the eye is the tissue of the body highest in vitamin C and that eyes with cataracts have almost no vitamin C. It looks as if cataracts are caused by a prolonged vitamin C deficiency.

Recently I gave these vitamins to a friend of mine who has cataracts, although I felt that they were too old to cure. How-

Good Health in Life and Old Age

ever, he told me that when he went to his doctor after a few weeks, the doctor asked him what he had been doing. He told him of my vitamins. The doctor said that he had not told him before that he had glaucoma as well as cataracts; the glaucoma had now entirely disappeared. He said he had not seen this happen before without an operation. I will follow this up and see if this really is a cure for glaucoma. It might be so. Certainly my own eyes are in good shape.

Vitamin B₁ is the only vitamin whose bodily effects we can reproduce in the test tube. When muscular action takes place, tissue is broken down through a series of changes which finally produce peruvic acid. This is split by the blood into water and carbonic acid, and is carried away. The active agent in this reaction is vitamin B₁. If this is not present in sufficient quantity, the peruvic acid is not removed from the muscles with sufficient rapidity. The muscles then become poisoned and sore, and ache until the acid is removed. As I grew older, I found that whenever I exerted my muscles so they made any considerable amounts of decomposition products, they became very sore and remained that way for a day or so. After I read about the action of B₁ in muscles, I thought I would see just what its effects really were in my case. I was then taking four milligrams of B₁ a day, which evidently was too little. I then took six milligrams, exercised some muscles until they ached, and found they still remained sore a long time. Then I took eight milligrams a day and found that the soreness remained a much shorter time. When I took twelve milligrams of vitamin B₁ a day, I found that the muscles ceased being sore just as rapidly as they did when I was younger. I have continued taking this amount ever since then, and I have no more sore muscles. Perhaps many

Days from Seventy-Five to Ninety

other old people could get the same beneficial results doing the same thing; but they had better have a doctor's advice.

It is not that I have had continuous good health through life that I am well now. I had typhoid fever which left typhoid mucus in the gall bladder. This, in a few years, caused severe gall-bladder trouble which could not be diagnosed with certainty at that time with X-rays. I became very worried at my continual ill health and asked my old friend, Dr. Herman Biggs, what he would do if he had a similar condition himself. He told me he would have an immediate exploratory operation. I told him that this was just what I wanted to hear. I then went at once to my surgeon, Dr. Forbes Hawks, and arranged for an operation at my own house the next day. I asked him to sew me up extra well as I intended to get up after the operation. He said he would, but thought I would not want to get up for a long time. He told Mrs. Hewitt and the nurse that I could get up. When he reached the gall bladder, he found it full of pus and about ready to burst. This immediate operation saved my life. In the middle of the night after the operation, I was in great pain from gas. I told the nurse to get me my dressing gown and I would sit by the fire. There I soon fell asleep. Mrs. Hewitt came in and put her hand on my bed and, when she found me gone, let out a tremendous scream. I told her not to wake me up as I was by the fire. Every day I was up and Dr. Biggs came to see me. He said he had always wanted to see a patient get up after an abdominal operation since he thought the patient would do better, but he had never seen it done. Now it is regular practice, and I began it.

I had a burst appendix at seventy-five, have had a number of fatty tumors removed, and have had grippe in my kidneys

Paget's Disease

with two severe bladder hemorrhages. Yet I recovered and have not had grippe since. As a boy, I had diphtheria and was ten days in a steam tent while they despaired of my life. I coughed up the mucous lining from the windpipe and got well. This is preserved in a medical collection. About the only common disease I have not had is scarlet fever.

Paget's Disease

WHEN I WAS ABOUT SEVENTY, I BEGAN TO HAVE SERIOUS trouble with my knees and they became very painful. I finally had to wear braces which I designed myself. My doctor diagnosed the trouble as "Paget's disease," in which the lime salts are removed from the bones and they get soft; where the muscles attach to the bones, there is pain. He told me that this was regarded as incurable and that I would probably get much worse.

Fortunately, I happened to see an article in the *Journal of the American Medical Association* in which some Berkeley doctors had analyzed the blood of every fracture case they had and observed the rate at which the bones repaired themselves. They found that when the ratio of the calcium to the phosphoric acid in the blood was 3 calcium to 1 phosphoric acid, the repairs were rapid. But when there was any other ratio, the bones built slowly or sometimes not at all. When they brought the blood to normal calcium-phosphoric acid ratio, they always secured rapid bone repair. I called my doctor's attention to this and said I believed that here was the cure for Paget's disease.

We made blood analyses and found my blood was 5 calcium

Days from Seventy-Five to Ninety

and 1 phosphoric acid. I then took more lecithin which is 10 per cent phosphoric acid, and also ate much fish, which is high in it. In two weeks the blood analysis showed a normal calcium and phosphoric acid ratio, and the pains in the knees were much better. In six months, they became bad again and we made more blood analyses and found that the phosphoric acid was too high for the calcium. I then got the idea that if the blood could take lime salts from the bones to get in balance, it could also take them from the intestines if they were in the right amounts. I then took a teaspoonful of calcium gluconate and a teaspoonful of lecithin every morning for breakfast, and the blood became perfectly balanced and has remained so for five years. The lime salts have become replaced to a great extent in the leg bones, and I have no more pain or trouble with Paget's disease.

I broke my leg just below the knee two years ago and the bone knitted perfectly, without a splint, in three weeks. This shows that lime salts are now being properly deposited in the bones. My doctor tells me that he has treated forty-five cases of Paget's by this method and that they are all getting well. He expects to publish this soon. So far as I can see, my legs are now well enough and my braces are discarded.

Here was a case where my scientific reading saved me from a serious disability for life.

Overweight

OVERWEIGHT IS ONE OF THE LEADING CAUSES OF ILL HEALTH IN old age and is the cause of the premature death of many. In overweight people the heart is required to pump blood

Overweight

through much useless tissue and therefore becomes exhausted. Few fat people ever reach great age. If one looks at a fat animal when it is cut open, one will see that the fat is collected around the internal organs, crowding them against the ribs and allowing them less freedom than they should have. This must be bad for the organism. In order to remain at normal weight it is essential not to eat more food of any kind than will supply the energy required for daily activities. If more food than this is consumed, it will slowly be deposited as fat in the body.

The small boy who was asked by his mother whether he was hungry and would have another piece of pie, replied, "No, mother, I am not hungry, but thank God I am greedy." He disclosed the truth about the behavior of most people.

Any kind of food in excess can make fat, some more than others. As it is very difficult and troublesome to estimate the calories in the foods one eats, I devised a method of my own for keeping weight normal. This works perfectly for me; I get plenty of food and never feel hungry at the close of a meal. I divide my foods into two classes: those which are mostly water (over 75 per cent), and those which are almost all solid food. The watery foods are: meats, 75 per cent water; fruits, 80 per cent water; poultry and fish, 80 per cent water; fresh vegetables, 90 per cent water; and milk, 85 per cent water.

The dry goods are such things as: butter, sugar, dry toast, crackers, and candy (all over 90 per cent solid food); salad oil, which is all food; and alcohol, which is also converted largely into fats. Cream is about 40 per cent fats.

I eat amply of the wet foods and let the dry foods alone, or take very sparingly of them. In this way, one gets a much smaller amount of real solid food than usual, and weight can be held down easily.

Days from Seventy-Five to Ninety

If I find at any time that I am gaining weight, I just reduce the size of the food portions I take on my plate until my weight reaches the point desired. It is not hard to do this. I weigh 160 now and weighed 156 when I was married in 1892. At times, before I realized that overweight was injurious, I have weighed from 180 to 190.

In losing weight it is not desirable to lose more than a pound or two a week. Weight changes should be made slowly, so as not to disturb the regular rhythm of the body. All special or restricted diets should be avoided as they are usually unbalanced for nutrition and may cause serious deficiencies in the body. Two members of my own family met their deaths through restricted diets. They lost vitality and became prey to the diseases that killed them. Losing weight, and also maintaining a normal weight, is a perfectly simple matter. If one does not do it, it simply means self-indulgence and lack of character. Everyone ought to realize this and brace up. If one cannot keep weight down, a psychologist, not a doctor, is needed.

Alcohol

AS I HAVE TOLD EARLIER, I HAVE NEVER CONSUMED ANY alcohol, except an occasional drink, so I have not had to deal with alcoholic problems myself. But I have studied much about alcohol, observed others all my life, and have formed some opinions about its use which are, I feel, correct.

A moderate amount of alcohol is not bad for most people and may be very good for some. It should never, however, be taken in concentrations higher than those found in wines, or at most over 15 per cent. Stronger alcohol than this con-

Alcohol

gests the lining of the stomach and interferes with the secretion of the digestive pepsin. Lower percentages of alcohol increase the flow of pepsin and aid digestion. The highball is about the best drink to take, or Rhine wine and seltzer. Here the alcohol is diluted to the right percentage.

Strong alcoholic drinks, if taken in quantity over a long time, will remove the vitamin B₁ from the liver. Dr. Graham Lusk told me that, when he was in charge of the alcoholic ward at Bellevue, he tried giving the delirium-tremens patients alcohol while at the same time he injected large amounts of B₁ vitamin. The delirium stopped although the patient was still getting ample alcohol.

With most people, alcohol is partly converted into fats in the body and it is difficult for even moderate drinkers to keep their weight down since they don't realize that alcohol adds to it. Alcohol also takes the place of other foods as it furnishes energy though not the vitamins or food products needed in the body.

Stimulation felt after an alcoholic drink is temporary, and then after a time the vitality drops below normal. The Hudson's Bay Company would never allow its trappers to carry alcohol on long trips where strenuous bodily work was required. They found that men stimulated by alcohol often had such a slump in vitality that they froze to death.

It is still a debatable point as to whether alcohol causes circulatory troubles or cirrhosis of the liver, but it is well known that it causes gout in some people.

So far as I know, wine with meals in moderate amounts has never done any harm and is good for most people.

Smoking

SMOKING DOES FAR MORE DAMAGE THAN MODERATE DRINKING. This damage is not only the proven danger of cancer of the lungs, throat, and mouth, but far commoner and practically universal is the injury to the circulatory system and the nerves, and often the eyes.

The danger of lung cancer is not a very active one. There are only about twenty-seven thousand lung-cancer cases in the United States now, while there are possibly seventy-five million smokers. The danger of mouth and throat cancers is much greater because there is not only the irritation due to the smoke and its cancer-forming substances, but also the danger of irritation to the lips and tongue. Pipe smokers often have cancers of the lips due to this irritation over many years. This is more true of cigar smokers than of those who smoke cigarettes.

The nicotine of tobacco is a most violent poison and only a small amount of the pure alkaloid will cause death. The very small amounts obtained in smoke have a very distinct effect on the nerves. It is also habit-forming as is shown by the great difficulty many people have when they want to stop smoking. Smokers seem to require a constant repetition of smoking to quiet their nerves. This is certainly not a good thing for the body.

The worst effects of smoking are on the circulatory system. Circulatory diseases are almost universal in smokers in later years. Raymond Pearl made a study of twenty-seven thousand non-smokers, light smokers, and heavy smokers, and found that the light smokers shortened their lives by about two years

Coffee

over the non-smokers, and the heavy smokers five years. Is it worth while?

Smoking seems also to have the effect of making people careless of the comfort of others. They never seem to realize that there are many people who hate smoke and even some whom it makes ill. When I find people, and especially women, smoking in a dining car, I always call the chief and ask if this is a "smoking car." He replies, "No." I then tell him to stop the smoking, and if he refuses I get his number and report him. You ought to see the ladies glare. They ought to have better manners and consideration for others. Smoking at meals is bad manners at any time and should not take place anywhere. It is a form of selfishness which should be stopped. Smoking in bed is most dangerous and has caused many deaths from fires. I will not allow it under any conditions in my house. If anyone does it, I will not have him again. It is inexcusable.

Coffee

MOST PEOPLE, AND EVEN SOME DOCTORS, DO NOT UNDERSTAND about coffee. It is found to be perfectly harmless for some people—they can take all they like—while it is very bad indeed for others. With some it causes sleeplessness and with others it has no effect on sleep. This is my own case.

A few years ago I found the explanation of what coffee does in a book by Dr. Harold Abramson, who was treating diabetic cases. For diagnosis he gave patients the usual meal of sugar and noted how this reacted in the blood and urine. This is the regular procedure, and in this way is determined just what the insulin dose should be. This test is made two hours after the

Days from Seventy-Five to Ninety

sugar is taken. Dr. Abraham thought he would follow the test further and make examinations every hour for twelve hours, and see just what happened over a longer period. He found that when people take coffee, it liberates a large amount of blood sugar from the liver. This raises the sugar of the blood above normal and the pancreas secretes insulin in order to bring the blood sugar back to normal. When this occurs, the pancreas ought to stop secreting insulin in excess amounts and hold the blood sugar to normal. However, he found that in some people the pancreas went on secreting insulin and reduced the blood sugar way below normal in about two to three hours. Low blood sugar slows brain action and makes one feel logy, depressed, and tired. These people are then likely to make mistakes in their work or have accidents. They then take another cup of coffee, or a drink, and the process starts all over again. When they go to bed, the blood sugar drops, and they can't sleep and are restless. With these people it is not the caffeine itself which keeps them awake, but the low blood sugar. If they take sugar or a carbohydrate on going to bed, they will probably sleep well for a few hours while the blood sugar is normal. People of this type should never touch coffee yet there are many who do. No cure has yet been found for this condition, except leaving coffee alone.

I found, when my kidneys were ill with Bright's disease, that coffee was very bad for this condition, and I have never taken it regularly during my life. I take it only when I go out, as I get a great stimulation following it. With me it acts much better than alcohol which congests my brain and makes me dull and woozy. That is, if I take more than a minute amount.

Coffee also dilates the capillaries of the urinary tract and for

Lecithin

this reason is not good for some people. Everyone should investigate and find out if coffee is good for him physiologically. If it is not, he should let it alone if he wants to have good health. There is nothing I like so well as coffee and yet I must not indulge in it, and I don't.

Lecithin

WHEN I WAS A STUDENT IN BERLIN IN 1891, MY FATHER GAVE me a letter of introduction to Geheimrath Rouleaux, who was then the best-known physiological chemist of Germany. On my father's account, he took pains to be very kind to me and often asked me into his laboratory which was in the same building where I worked. He told me of the work he was doing on the physiological role of lecithin in the human organism and gave me some of his papers on it. He also told me of books on the subject which I secured and read. He had found that lecithin was present in all the cells of the body, and in particularly significant amounts in the nerves and brain cells. It must, therefore, have very important functions in the body. At that time the only source of lecithin was from egg yolk, where it exists in about 2½ per cent. This makes it expensive to isolate in quantity, and therefore the medical profession had never made very extensive studies of its physiological value or used it to any large extent in medical practice. I kept this information in mind and retained the books I had on the subject. It was one of those things stored away for future use some time.

One of my fishing correspondents, whom I had never seen, asked me to come to Cleveland and go with him to fish the

Days from Seventy-Five to Ninety

waters of the Castalia Club in Ohio, which are famous for their large brown trout. At breakfast in the railroad station, I asked him what business he was in. He told me he was the son-in-law to the president of the Glidden Company, who were large extractors of soybean oil. He had just been detailed to find a market for their crude lecithin which was a waste product of soybean-oil refining. He said he supposed I knew nothing about lecithin. I told him he was wrong there, as I probably knew much more about it than his factory chemists. I suggested that one outlet would be pure lecithin for medical use. They had never heard of this before. I told him I would send him some literature on the subject, which I did when I returned home. A few weeks later I received a half-pound bottle of lecithin with a note saying, "Here it is. Where do we go from here?" I made some suggestions as to how to preserve the product better and make it more palatable, and wrote him of its value in human diets. The Lathe family and others in the office took it and they soon began to feel its good effects. It soon was in such demand that they had to establish a small plant for its manufacture. From this, sales have grown to a quarter of a million pounds a year, with no advertising. This was the beginning of the sale of purified lecithin for human use in this country, all by chance.

Lecithin is a very complex chemical molecule containing two recognized vitamins, choline and inositol, as well as lecithin itself and cephalin. It is very high in available phosphoric acid and also contains some other valuable elements. Rouleaux's discovery of its presence in all the cells of the body, and especially in the nerve cells, proves it is an absolute requirement in human diets. It has been found that it generally is deficient in most diets we eat. As it is in the nucleus of all cells where

Lecithin

their reproduction starts, an ample supply evidently favors cell reproduction and renewal. This seems to me to be the explanation of the effects we observe in people who regularly take ample lecithin. They may recover from a great variety of illnesses which must have originated in the cells of some part of the body not being renewed with sufficient rapidity. This view accounts for the large number of diseases that lecithin seems to cure, such as arteriosclerosis, arthritis, lumbago, diabetes, high blood pressure, skin diseases, and even some brain troubles. Such cures vary in rapidity from a few weeks to a year or more, but there is nearly always a recovery or great improvement. High blood pressure and coronary thrombosis are caused by cholesterol deposits in the arteries. Lecithin will emulsify and remove cholesterol when it is high enough in the blood stream, after a lapse of time. I have seen a number of coronary thrombosis cases entirely cured by lecithin. About half the high blood pressure cases who have taken lecithin have their blood pressure lowered considerably and often brought to normal. I myself have taken lecithin for over fifteen years and my blood pressure is 125 over 80, the same as it was in youth, and there is no hardening of the arteries in my case.

About a tablespoonful of lecithin every day is recommended for best health. I never omit it. There has been almost no medical literature about lecithin so far and doctors know little about its use or effects. They usually say, "Take it, it is good food and will do you no harm." They are often surprised at the results they see. There is much medical work going on with lecithin at the present time and it is hoped that there will soon be ample medical literature on the subject. I know myself, from personal experience, what it can do for the health of many people; it is a good food and can do no harm.

Days from Seventy-Five to Ninety

It gives me great pleasure to feel that I have been instrumental in getting this most valuable help to human health before the American public. I have never made or tried to make any money from this development. I felt that if I did, I could not speak so freely about it and advocate its use. Besides, I felt strongly that here was something I could do for others with no return. I know that lecithin will become one of the most important aids we have to human health in a few years. It will probably prolong the lives of many people and certainly make their lives more enjoyable.

Sex Hormones

AS WE GROW OLDER, FROM FIFTY-FIVE TO SIXTY, THE SEX hormones are not produced in our system in sufficient amounts to maintain our vitality. These hormones have many other functions that affect us besides the sex impulse. They affect our nervous system and muscular strength. When these processes begin to slow up, it is most useful to supply more sex hormones than are naturally made in the body. Doctors can prescribe the right amounts. They should never be taken except under medical prescription, for in some cases they may affect the heart or cause cancers. Testosterone propionate is the one usually prescribed. Formerly this had to be injected and it was a nuisance to have this done every few days. Also the supply in the system would constantly fluctuate. A few years ago it was found that these hormones could be absorbed from under the tongue and get into the circulation through the lingual vein. It takes twice as many hormones administered in this way to produce the same effect as an injection but the

Sex Hormones

results are better. Ten milligrams a day are usually used, and ten-milligram tablets cost eleven dollars per hundred. Still eleven cents a day is not much for more vigorous health. I have persuaded a number of my elderly friends to get their doctors to give them these hormones. In every case they told me that their vitality increased greatly. These tablets have no effects on the sex impulse whatever. I regard these hormones as one of the most important things yet discovered to lengthen life before crippling old age sets in. I have taken them for the past twenty-five years.

I did not realize what they were doing for me until I went to the country a few years ago with two bottles to last through the summer. When I had used up one, I opened the other box and found that the bottle was empty. My maid had put the empty bottle back into the old package. It was a week before I could get any more. In three days I felt like a miserable old man, just full of aches and pains. I thought I was getting sick. When the new supply arrived I was perfectly well again in two days, without any aches or pains. Since then I have taken care not to be without these hormones. During my trip to Spain, I had to make a number of very long automobile drives, which usually tire me greatly. In the morning, before such a long day, I took two of these tablets and found that I was not in the least tired at night, nor did I feel the strain. I was eighty-four at the time.

Doctors have found that cancer of the prostate may come from the continuous taking of this male hormone. They now give female hormones, alternately, to balance the male hormone so there is no danger of cancer. If these medicines are properly controlled they are most beneficial, I am sure.

Days from Seventy-Five to Ninety

Diet

A REALLY GOOD AND ADEQUATE DIET IS PROBABLY THE MOST important factor in good health in active life as well as in old age.

There can be no "one best" diet for all. Our inheritance is so varied that what is suitable for one is not good for another. Each person must work out his own diet for his particular personal endowment. However, we do know many things which are agreed to by all students of nutrition. There must be a proper balance between proteins, fats, and carbohydrates, and the proteins consumed must be properly balanced in the composition of their constituent amino acids. No more total food of any kind should be eaten than sufficient to supply energy for daily bodily activities and for the repair of the tissues used up. It has been found that a 160-pound man, for instance, requires about .1 pound, or 1.6 ounces, of protein (dry basis) a day for the repair and maintenance of his bodily tissues. This means roughly that, if he eats animal proteins, he must consume about 8 ounces of wet proteins a day—roughly these have an average water content of 80 per cent. More than this amount must be eliminated as waste or stored as fat. Proteins and fats build bodily tissues while the carbohydrates furnish heat and energy for work. When they are consumed in excess of the bodily work performed, they are largely converted into fats and are stored in the body tissues. This was made clear in the section on overweight.

The main reason for the present fad of a high protein diet for weight reduction is that the proteins we eat are largely water. Without getting too much actual food we can eat more

Diet

of proteins than we can of carbohydrates, which are largely taken in more concentrated form. While excess proteins are readily eliminated through the kidneys, there are many people whose kidneys will not stand much excess work (more than the body requires normally) and these organs break down eventually on a very high protein diet. I was a victim of this myself. A very high protein diet can be really dangerous for some people. The best chance of good health lies in a diet containing protein moderately in excess of bodily requirements, supplemented with ample vitamins to supply whatever happens to be deficient in the diet itself. About 35 per cent of the diet in actual well-balanced proteins will generally furnish an excellent diet.

When I was running my trout hatchery, I tried to find out just how much proteins fish actually needed. I reduced the proteins gradually little by little, until I found that trout would do well on 15 per cent proteins, but would do badly on 14 per cent. Therefore 15 per cent seemed to be the lower limit for them. I have no doubt that the same holds true of men but have no proof of this. It is safe to have at least 35 per cent protein in the diet.

Fats are necessary for health. During the First World War the German people suffered many diseases which were caused by a low fat diet. About 15 per cent of the weight of the diet is generally considered about right for fats. Fats are of two kinds: those called saturated that have little affinity for any other compounds, and those called unsaturated having more or less strong affinities for other chemical molecules, particularly oxygen. These unsaturated fats easily become rancid, or spoiled and unsuitable for eating, but they are excellent dietary factors when fresh. Their very unsaturation allows

Days from Seventy-Five to Ninety

them to take part in the metabolism of the bodily processes readily, while the fully saturated fats are assimilated with difficulty, become deposited in bodily tissues in unwanted places, and are hard to remove. They are much more indigestible than fresh unsaturated fats. Chemists sought for many years to overcome the spoilage of these fats and finally succeeded in saturating them with hydrogen, producing fats that do not get rancid. At that time, no one thought of the digestibility of fats, only of their spoilage, and its prevention was considered a great advance. We now know that this makes fats much more indigestible and useless in the body, and not such good food. There is probably no way to preserve unsaturated fats from spoiling except by keeping them cold and away from the oxygen of the air. What we ought to do is to arrange to consume them fresh, just as we now do meats, vegetables, and fish. Our diets would be far more healthy if this were done.

Fats have been blamed for the deposits of cholesterol in the arteries which cause arteriosclerosis, but I strongly believe that this is not the case. It is not the cholesterol carried by the fats which causes the trouble, but the cholesterol made within the walls of the arteries themselves which causes deposits when it is not continuously removed by blood containing enough lecithin to emulsify and remove it. If this is the case, then cholesterol carried by fats will not cause unwanted cholesterol deposits. I have proved this to my own satisfaction by using enough lecithin and taking a high cholesterol diet, and there are no cholesterol deposits. I hope the medical profession will soon take this point of view; when they do, they will cure more arteriosclerosis cases.

There are large numbers of fatty acids which, combined

Diet

with glycerine, form the fats we ordinarily see. Butter has six or eight different fatty acids in it, and they must be useful in the dietary or they would not be present in milk which is supplied for feeding the young of all mammals. One of the fatty acids which seems to be particularly valuable in the diet is linoleic acid. This is not present in significant amounts in animal fats, but it is in vegetable fats, such as cottonseed oil, soybean oil, and peanut oil, where it exists in considerable amounts. Olive oil has almost none. Therefore, in salad dressings, cottonseed oil and soybean oil are better than olive oil from a health point of view.

It is not wise to starve oneself for fats in order to keep weight down. This should be done only by the reduction in the total amount of all foods eaten, and not by the restriction of any one type of food, a practice dangerous to health. We should have a widely varied diet with every kind of good food the body can tolerate. This way we get all kinds of needed minerals and many other organic bodies; we do not yet know the uses of many of these in our systems.

There is one thing about proteins everyone should know and understand well. There are twenty-three amino acids now known, and ten of these are necessary for bodily health. If any one of these is absent from the diet health becomes poor and death comes early. The deficiency of each one of these causes different disease symptoms. When we eat our food containing proteins, these ten amino acids must all be present, *at the same time*, and in definite amounts with relation to each other, to be properly assimilated. When supplied at successive times, even two hours apart, they are not assimilated because they must all be present together to be taken up. The amino acids of the animal proteins such as meat, fish, eggs, and milk

Days from Seventy-Five to Ninety

have their amino acids well balanced and they are readily assimilated. But the proteins of vegetable origin are much less useful in the diet because they do not have their amino acids in the right proportions. Often one or more of them are missing entirely. More of them must be eaten to get the same results. Any continual starvation for sufficient amino acids shortens the life span greatly. It also reduces vitality while living. Protein starvation is largely the cause of the short-lived peoples of Asia. They get enough carbohydrates for heat and energy usually, but far too little properly balanced protein foods. Their vegetable proteins could easily be properly balanced by the addition of very small amounts of the deficient amino acids. I have tried to get this matter considered by the United Nations food committees, but so far without any actual response. It is sure to come sooner or later since this is the cheapest way to feed nations now underfed. Rather than trying to grow far more foods of the same types they use at present, which will take many years and great expense to bring about, food supplements could be given now. However, these ideas are far too new to take hold yet.

So far as I know, all nutritionists are agreed that for best health and vigor one should have a good breakfast with ample proteins in it. After the long night without food, it is necessary for the body fires to be stoked up again amply for the day's work. The common habit of a light breakfast with the temporary stimulation of coffee is bad for health and vigor, and will shorten life. The habit of a good breakfast is easily acquired. The standard English breakfast of bacon and eggs is excellent if supplemented with a glass of milk. Those who can take coffee without injury can take this also. For those who

Commandments for Health

can't, it should be eliminated. The breakfast protein will furnish energy slowly through the morning until lunch.

It is not convenient for most people to eat a hearty meal at lunchtime and rest a little afterward. This is all the more reason why these people should have a good breakfast to carry them on. Most people have their main meal at night which gives them more food to carry them through the long period until breakfast. Most people do rest somewhat after dinner as they should.

For myself, I find that a breakfast of oatmeal and milk, with a teaspoonful of lecithin mixed in the oatmeal, a glass of milk, lamb chop, or hash with poached egg, or eggs and bacon, or fish, with fruit after, together with a small glass of orange juice, make me the ideal breakfast with no lowering of blood sugar during the day. I do not take coffee as it is bad for me.

I always have a good sleep after lunch, which is my heavy meal. I have five o'clock tea and a very light supper. I have a glass of milk at every meal, always. This is sure to supply well-balanced proteins anyway, no matter what the rest of the food may be.

So far as I can see now, my diet has been ideal and has kept me well, both in mind and body, up to the age of ninety.

Commandments for Health

WHEN MY GOOD FRIEND DR. L. W. GORHAM, WHO IS HEAD OF the Public Health Research Association of New York, read my manuscript, he said that my list of requirements for good health in old age should be called the thirteen commandments

Days from Seventy-Five to Ninety

for health. He felt that I had not missed any. They are as follows:

1. Avoid overeating at all times, and regulate the food intake to maintain normal body weight.
2. Take all vitamins every day in the right amounts.
3. Take a tablespoonful of lecithin every day regularly.
4. Avoid straining the heart at any time by exercise; take only moderate and reasonable exercise after middle age; rest the heart as much as possible in old age.
5. After middle age, take sex hormones under competent medical advice.
6. After sixty years of age, take a nap after lunch, if possible.
7. Avoid stimulation of alcohol, smoking, or coffee, if these do not agree with one's health.
8. Avoid all sleeping pills, unless they are prescribed by a doctor when absolutely necessary.
9. Avoid all narcotics, unless given by a doctor in a crisis.
10. Have no fear of surgical operations when performed by a competent surgeon.
11. Attend all bodily ills without delay.
12. Eat a good diet with at least 35 per cent animal proteins, about 15 per cent fats; and the balance carbohydrates.
13. Eat a hearty breakfast with ample animal protein.

If anyone still in reasonably good health will have character and persistence enough to follow these thirteen commandments of health, he will probably enjoy from fifteen to twenty years more of vigorous bodily and mental health than he would otherwise. We will never be able to prolong life beyond

Commandments for Health

its natural span, and it is not desirable that we should, or the world would soon be full of old people. But the natural span of life ought to be much longer than it is now because it seems to be the general rule in the mammalian kingdom that the length of life is ten times the period of growth to maturity. We ought, according to this, to live two hundred years. The longest recorded cases are about one hundred and fifty years, so far. It would be no advantage simply to prolong life unless one were active and vigorous in mind and body. This is the aim I have set myself to achieve and so far I have met with some success.

Part IV

The Modern Economic Revolution

AS I LOOK BACK ON THE CHANGES I HAVE SEEN TAKE PLACE in my long life of ninety years, it seems to me that I ought to record my impressions of what I have seen, and also the deductions which I have made as to what will happen in the future. The point of view of one who has been through all these changes is much more likely to be right than that of any younger student of the subject, who has not had the actual experience of what has taken place. Personally, I have no faith in the conclusions of professional economists who get their information from books and statistics. They cannot see the forest for the trees, as they have more information than any human mind can digest. I will point out what I have observed and the personal conclusions I have drawn from what I have seen.

During the Industrial Revolution in England in the early part of the nineteenth century, large business enterprises grew up under the ownership and management of men of the middle and working class. They had great specialized abilities for this work and carried it on with great vigor to financial success. As England was ahead of the rest of the world in this development, the rewards for this work were very great and large fortunes were accumulated. Most of these successful enterprises were either owned by families, or individuals, or partnerships. Stock companies were the great exception during this development. As these businesses grew, they naturally fol-

Days from Seventy-Five to Ninety

lowed the old shop employment system where the proprietor engaged his workmen and paid them the smallest wages he could get them to work for, in the belief that the less he paid for labor the larger the profits. No one ever thought of building up a market for goods to be purchased by the laborers themselves, if they only had more money to spend. It was this attitude on the part of employers which shocked Karl Marx and made him develop his theories of the relations of capital to labor, which were quite correct under the conditions prevailing in his time. However, when the relations between capital and labor changed with the years, his theories proved to be absolutely erroneous; but they still make plenty of trouble in the world. The gradual rise of labor unions to power has greatly altered the relations between capital and labor, and the employer no longer can make men work for just a subsistence wage. Even when I was running an automobile manufacturing shop in 1907, at Hammersmith in London, the current wages for mechanics were quoted to me by my Scotch foreman as sixpence an hour. When I said that this was too little to pay any man and suggested eight pence an hour, he was shocked and said I would disrupt the whole wage scale.

This first generation of industrial employers in England was made up of men brought up under frugal conditions. They were not lavish spenders, but reinvested the profits of their enterprises in their businesses to build them up. When their sons came along, they wanted to have them brought up under better conditions than they themselves had known. They sent their sons to good schools and quite often to the university. This second generation of industrialists often consisted of very competent businessmen, who continued to build up their business enterprises and pay attention to them, although they spent

The Modern Economic Revolution

far more money in living than their parents had done and reinvested less of the profits in their businesses. When the third generation of these industrialists came along, the parents wanted them to be gentlemen and to lead the lives of gentlemen as the aristocracy was doing at that time, all over England. When the third generation assumed control of their family business enterprises they devoted too little attention to them and left the management entirely to hired employees. They took most of the profits from the business enterprises for their own spending and personal expenses, and put back into the businesses entirely inadequate amounts to maintain them in up-to-date condition that could withstand competition.

And so it happened that when American, German, Belgian, and French competition developed, after the adoption of the machinery and factory methods invented mostly in England, the British enterprises were rarely able to compete successfully on a cost basis. This condition has rapidly become worse since American factories have developed their mass-production methods, even paying double the wages paid in Britain.

Of late years more and more British industry is going into stock companies and giving up the older family and partnership type of ownership. Where this is done, the companies may get access to capital subscribed by the public, and competent boards of directors can keep the equipment of the enterprises up to date. It would seem that this is the only salvation for the British industry, but it may be too slow in taking place to save the country from collapse.

When I first began going to England with my father, starting in 1883, the big business enterprises were nearly all in private hands. The owners of them were mostly the second generation of the men who had originated and built up the

Days from Seventy-Five to Ninety

enterprises. I saw and knew many of these industrial families at that time, and their sons were all being brought up to live as gentlemen and not devote themselves to their family enterprises.

My next contact with British business was when I went over there to establish an automobile manufacturing business in 1905. By that time the third generation was taking control and as a whole was paying little attention to family business. They were devoting themselves to living like aristocrats and spending the profits of their businesses. I could see at that time what was already beginning to take place.

My third contact with British business was during the period from 1924 to 1929. I then had a moor in Scotland and saw a great deal of the gentleman class and often talked business with them. I found, in all my contacts, that the family business was declining in earnings and being seriously neglected. The profits of the business were being drained out and the enterprises were almost universally going on the rocks. I foresaw then what was coming and that, unless some great change took place, England could no longer compete successfully in the world in manufacturing business. They had developed tremendous markets in all parts of the world, which they partially controlled in various ways. This kept English business alive, even though it was no longer in a competitive position. The two world wars have largely wiped out most of these markets and England no longer can hold them for herself. When the Japanese and the Germans get really going again, Britain will meet most severe competition and, under present conditions, she can no longer make enough goods at competitive prices to keep going successfully. There is a tremendous amount of ability in England in engineering, chemistry, and

The Modern Economic Revolution

technique, but at present they lack the capital to put this talent successfully to work or the know-how to apply what capital they have available to the best advantage. When American support is withdrawn I cannot see anything in sight but most serious trouble for England and a much lowered standard of living. Unless their industry is put on a really competitive basis, they must become a second-class nation for a long time to come. The outlook is not hopeful.

When I was a young man just out of college and beginning my business career, nearly all the large business enterprises in this country were owned and operated by individuals, families, or partnerships. There were comparatively few large industrial business enterprises which were run as stock companies, and in which the general public had a financial interest. It was at the time when I returned from Germany and entered business, in 1892, that the first manufacturing companies were beginning to be made into stock companies by the banking interests. The railroads and telephone and telegraph enterprises were already operated as stock companies with public participation, because the amounts of capital required for these enterprises were too large for individuals to handle. But the steel industry and most of the other manufacturing enterprises were owned and operated mostly by individuals, families, or partnerships. It was the organization of the U.S. Steel Corporation that unloosed the dam holding back the banking interests from taking over these enterprises and floating stock issues with the general public. Since that time, nearly all the large manufacturing enterprises have become stock companies with public participation. So far as I know, the Ford Company was the last very large company which was

Days from Seventy-Five to Ninety

entirely family-owned. Even the du Pont Company has placed its stock on the market.

This change in the type of ownership of manufacturing enterprises has had very widespread effects on our economy, and so far as I can see the effects have on the whole been beneficial, although there have been gross abuses in the management of some of the stock companies and in the manipulation of their securities. It took a number of years for the public to realize what was going on. The anti-trust laws and the Securities Exchange Commission have been evolved in order to curb these abuses in the manipulation of the securities owned by the public in business enterprises. There is no doubt that these methods of regulation will need much more elaboration and development as time goes on, but they were both necessary and a step in the right direction for the protection of the public against unscrupulous stock manipulations. This is the system which is going to endure in this country: stock companies in which the public participates, and the regulation by law both of the way the securities of these companies can be manipulated and of the way the companies are managed for the interest of all their stockholders. There is no doubt in my mind that we will evolve excellent methods of regulation within a few years. It has taken over sixty years to elaborate the Interstate Commerce Commission to the point where it seems to operate satisfactorily in the interests of the railroads, their stockholders, and the general public. As stock interests in all kinds of business enterprises are a far more complicated matter than the regulation of railroads, it is likely that it will take quite a long time before we get a perfected system which will be just to the public, the investors, and

The Modern Economic Revolution

labor. If we keep a free press and free discussion, we are certain to work this matter out to a satisfactory end.

If we accept the fact that this system of public stock ownership, under suitable government regulation and laws, is the one which this country is going to operate under for the future, as seems most likely, let us see what the great advantages of this system may be in a competitive world. Large corporations which have a long continued life have very great advantages over privately owned and operated enterprises because the private enterprise must depend for its success on the brains of the directing owners. If they are competent, as is usually the case with those who first build up a new enterprise, the business will be well run and can meet competition on equal terms. But when private business is inherited by a second or third generation, there is no assurance that the direction of the business will be in really able and competent hands. If it is not, it is not in a good competitive position and will lose ground to better-managed enterprises. But the large stock company with a long life, managed by a board of directors, has a constant supply of ability coming up through the business itself to draw on for the managing brains to run the business, and ability comes to the top positions by an evolutionary process. Such companies are certain to be well run by men of good training and ability, if the sifting process is allowed to take place. The best man naturally gets to the top. So far as I have observed, all our large stock companies are well managed at present. There was a time years ago when the banking interests, which floated the securities on the public, retained a great measure of control of the companies they floated and often appointed management which was not as competent as it should have been. However, as these com-

Days from Seventy-Five to Ninety

panies have grown older, the evolutionary process for rising ability seems to take place naturally, and all the older companies are now managed well by men brought up in the business. This is most important, because it is the managing brains at the top which make companies successful in competition and we must have sharp competition if we are to get the very best results. Even in companies which have little or no competition, such as the telephone companies, the selection of ability from the ranks of the employees does give the most excellent management and good service to the public.

Under the former system of private ownership of large enterprises, there was no assurance that the profits of business would be reinvested to a sufficient extent to assure its being kept up to the best standards to meet competition. With some companies, the business profits were almost entirely reinvested in the enterprise, as was the case with the Ford Company. This resulted in providing ample capital, for this company provided large profits during its early years. With other enterprises, such as the textile mills of New England, there was not a sufficient reinvestment of profits to maintain the plants in prime competitive condition. They have therefore gone way downhill and are today being displaced by newer and better run mills in other parts of the country. The same thing took place in the machine-tool industry which was originally located almost entirely in New England. When the time for expansion and renovation came, this industry did not invest enough capital in new and modern plants to withstand the competition of more enterprising firms in the Middle West, and much of the machine-tool business was lost in New England.

With many types of businesses, a system seems to be evolu-

The Modern Economic Revolution

ing at present which bodes well for the future. It is now regarded as the best practice to divide the profits of business into three parts. One part is paid to the stockholder owners, one part is reinvested in plant and floating capital, and one part is used for lowering the price of goods to the public and increasing the rewards of labor. The present tendency of labor unions is to try to get a larger share than this, and to restrict the amounts of capital reinvested in the business and returned to the stockholders. It is the balancing of these forces which provides the greatest problem at present for American business. It will also receive the attention of the legislative forces in the near future. Unless ample capital is continually reinvested in business enterprises, we would get results similar to those which occurred in England. There the railroads for many years paid out dividends too large and kept increasing their invested capital by borrowing on bonds at low interest rates, until the final result was that the capital investment became so large that the interest alone consumed the larger part of the earnings, as none of the bonds were ever paid off. Finally the total capital investment was so great that duplicate railroads could have been built new for half of the capital invested in the railroads. Then they were nationalized on this capital basis and can never be profitable enterprises again. We don't want our industries to get into any such shape or to make so serious a mistake. There must be continually an ample amount of reinvested profits in every business if we are to have a healthy and a constantly developing economy. It is also necessary that the capital furnished by the investing public receive a fair return or this source of capital will dry up. People will not put their money where they do not get a proper return on it. Labor can receive increased rewards in

Days from Seventy-Five to Ninety

future from the profits of business, but only when the other two parties have received their share. Unless they do, the business will not remain profitable and expanding, and labor will have to be reduced whether it is desirable or not. The plant of any enterprise must be maintained well to meet competition, and capital must receive a fair return or it will not invest. Labor can get more only when these two are satisfied.

It has been found that in America, with its immense internal markets, the lowering of the price of goods will often increase sales to the point where profits may be larger from goods at lower prices. We have universally found that when we manufacture in vast quantity, the cost becomes less. Many types of machinery can be employed in large-scale production which would be useless in small plants. This is found to be true even of farming, where with the use of large machines and areas, grain can be grown for half the cost of that raised on small farms with less machinery. Large enterprises can have adequate laboratory facilities, skilled scientists, the best engineering and commercial talent—things out of the range of any small business. Therefore in many types of business, it is impossible for small enterprises to compete with large ones and it is not to the interest of the public that they do so. The large companies are the only ones that can get out the goods at very low costs. It escapes the observation of most people that the few things which have not increased in price due to inflation are all those manufactured by the largest companies. Automobile tires are cheaper today than they were before the war, even though the prices of labor and materials have doubled in the meantime. The prices of electric-light bulbs have not gone up with increase in labor costs. Gasoline is still about the same price as it was. So far as I know, the prices

The Modern Economic Revolution

of all goods made by smaller enterprises are now about double what they were before the war. They have not been able to apply the labor and material savings which the larger companies have been able to introduce. Large companies believe in a large volume of business with a small margin of profit. This is the best and safest method of eliminating competition. Besides, where very large investments are involved to get into the business, few are likely to enter into competition. Mr. William Levis, then of the Illinois Glass Company, told me that it would take an investment of forty-five million dollars to get into their glass business and that he was perfectly willing for anyone to have the use of patents if he wanted to try. He was not in the least afraid of competition. The big electric companies are in the same position.

It is our vast untrammelled domestic market which has placed American industry in such a favorable position. We must realize that this market alone is as large as that of all Europe with its many tariff walls and regulations. Here we can plan business on a large scale and be sure of no domestic interference.

There is another factor, which has been developed during my business life, which has had the greatest effect on all our thinking and business. This is the idea, propounded first by Henry Ford, that it is in the interest of manufacturers to pay high wages in order to make an enlarged market for their own goods. Such an idea was revolutionary at the time and I well remember the great resentment it aroused among all businessmen at the time. I, myself, could not see far enough to imagine the implications of the policy he was starting. Ford announced he would pay no man less than \$5.00 pay each day and that if a workman could not earn \$6.00 for his employer, it was

Days from Seventy-Five to Ninety

evident that the employer was not competent to manage the business. At that time the wage was about \$2.50 a day. Of course, when one factory began paying higher wages it was only a short time before the others had to follow suit. The result was that the working men had more money to spend and this increased all business. Ford made his own market for his own cars.

Those higher wages have had many effects on our economy. They have made everyone look about to see what could be done to save high-priced labor, and this has, in turn, very greatly increased the productivity of the whole country. In many cases we have found that we can produce goods at prices just as low as before, and pay more wages. It has acted as an automatic tonic to all kinds of business, which has not been the case in Europe, where wages have not increased an equal amount. Of course, with their smaller markets Europeans cannot always adopt labor-saving machines to the same degree we can here. This gives us a great advantage over them, and enables us to pay our labor more and therefore have a higher standard of living. Europe will always excel in skilled handicrafts, where goods are manufactured in smaller quantities. As soon as the quantity gets large enough we can make goods at less cost, even with our higher labor, than they can in Europe. The attitude there is all toward restricting markets and maintaining prices and high profits. We have the large-volume markets and find that moderate profits on large volume are a sufficient restraint on competition. There can be no doubt as to which system must succeed best in the future.

We often hear people advocating the idea that the rest of the world, at some time in the future, ought to be brought to the same standard of living we have here in America. These

The Modern Economic Revolution

people do not seem to know that even if this could be done, there are not enough raw materials, such as metals, in the whole world to provide for any such condition. If it were brought about, it is calculated that all the world's iron would be used up in ten years and the supplies of copper, zinc, lead, tin, and other metals would last an even shorter time. The whole world can never be brought to the standard of living we enjoy in the United States, but it can have ample food supplies, clothing, and housing as soon as birth control is brought to the point where world populations have ceased to increase materially. This may take a very long time, but it might be brought to pass. Several countries now have approximately stationary population, such as France and Cambodia. Economic factors and birth control may reduce the population increase in other lands. At present the outlook for the future of the world is not good. Populations are increasing so much faster than food supplies that the outlook for the coming years is serious. Even great wars, such as we have had recently, have not materially reduced populations, and we are devoting ourselves to improving the health of people all over the world. This in itself will increase the earth's inhabitants without increasing the food supply. Are we doing good to improve health or are we increasing the number who will suffer in the future? It is difficult to see how improving health without increasing food will ultimately do any real good; it will only make more underfed people. The efforts of the world as a whole should be devoted to preventing population increase and to finding some way of producing more food. The food supply can probably be doubled, if what we now know of agriculture can be applied to all lands. We can also count on vast amounts of food from the sea, which we do not get now.

Days from Seventy-Five to Ninety

Let us hope that the United Nations may be of service along these lines in the future, for there is little hope of the U.N. being of any use in political matters or the relations between countries.

We have an entirely new set of social and economic conditions to adjust to in this country which never have existed anywhere in the world before, but we fortunately have inherited a governmental system which is flexible and can be changed to overcome the various troubles as they arise. People are prone to expect these adjustments to take place too rapidly and do not realize that large social masses must move very slowly. We want to do things too quickly, things that ought to take a long time for mature consideration and adjustment. Prohibition was a very good instance of a mistake which had to be corrected. It only took a few years before intelligent people realized that Prohibition would not work and was making serious trouble. However, it took sixteen years before the mass of the public came to the same conclusion, and then it was abolished promptly.

Our federal system consists of forty-eight states, each with its own government and constitution. This system constitutes, in reality, forty-eight governmental experiment stations where all sorts of legislation and economic and social schemes may be, and in fact are, tried out, without disturbing in the least the rhythm of the nation as a whole. When any of these various laws or experiments in government are successful, they are likely to be adopted by other states. If taken up successfully by enough of them, they are gradually incorporated into the national government. Failures serve as lessons to other states the same way. Thus, radical things can be tried out on a sufficient scale to see if they are advantageous, without in

The Modern Economic Revolution

the least disturbing the nation as a whole. No other type of government, except our federal system, has such a safety valve for trying out experiments on a political plant scale. Others have to try them out on a national scale, often with dire results to the nation. Look what socialism on a national scale has done to England. We are indeed fortunate in having inherited our peculiar federal system. It never would have been devised by anyone, it just came into being from historical causes.

We can, and will, adjust to any difficulties which exist, or may arise, in future, but we must not expect this to take place too rapidly. Ample time must be allowed for experimentation and consideration before the mass of people reach the right decision. Such a change is now taking place in this country in the shift from the former philosophy of the Democratic party to that of the Republican. If we can keep the avenues of information entirely open, and our governmental system flexible to meet changing conditions, nothing can stop forward progress. It is to our very great benefit to have socialism and communism tried out in England and Russia. We will see the results before such ideas take too deep roots in this country. When our people are once fully informed of what has really taken place, there is small danger that they will choose a wrong course.

The histories of Greece and Rome are one long series of experimentation with various forms of democratic and republican governments, which all broke down after longer or shorter periods of operation. Always some form of dictatorial control took their place. Why did this occur when we now feel that a democratic form is best for the great mass of the people, and we now think that such a form may be made to

Days from Seventy-Five to Ninety

endure permanently? I can think of two reasons why so-called democracy broke down in ancient times. The first was that the political groups where these democracies operated were rather restricted in area—quite usually to one city state. Under such conditions the larger groups of the population could be reached and swayed by a dominating personality. Now democratic areas are much larger and only a small part of the voters have direct contact with any political figure.

A second condition, and far more important, is the wide dissemination of information through the press, radio, and television. With a free press and free speech, nothing can be kept from the public for long. Dangerous ideas are fully exposed and discussed, and their merits evaluated before they take possession of the mass of the voters. Our main hope of avoiding mistakes lies in a completely informed public, and we will meet and solve difficulties as they arise.

When one thinks over the foregoing observations on our business and political economy, it is hard for me to see how the Russian communist system can ever compete with the efficient system we are developing in this country. While Russia has tremendous resources, both in materials and in manpower, and even if these should turn out to be greater than those we have or can obtain, it is hard to see how they will ever be as efficiently exploited under their present system as they could be under the one we now practice. It must be remembered that in our day the world moves forward at an increasing pace all the time and the laggard can never hope to catch up with the country which gets ahead, and keeps ahead. Russia can never make the most of the intelligence it has to draw on, so long as that intelligence is not allowed free opportunity to develop for its own advantage. If people are

The Modern Economic Revolution

continually ordered about to do only as they are directed, they can never develop their maximum powers. Personally, Russian competition in world business does not alarm me in the least, either now or in the foreseeable future. They are on the wrong track in human affairs, and until they get on the right track their progress is bound to be much slower than ours, no matter how much of our accomplishments they may steal and put into practice. By the time they get things going, we will have moved forward from that point.

The Soviets will certainly engage in a war with us if they ever think it is to their advantage to do so and they think that they can win. Their will for world domination is firmly fixed, and they intend to carry it out. There is nothing we can do to stop them, except to be so strong that they will not attempt it. If war should come, it will result in a most terrible destruction both in our country and in theirs. Civilization will not be wiped out as is so often predicted, but the world will be set back many generations and our population may be greatly reduced. Such an outcome is quite conceivable. There can only be one end to such a war: we will win it eventually because we have the greater resources in industry, brains, and capacity to make war materials. Any war equipment prepared in advance of a war is certain to be outmoded after the war has been in progress for some time. Both the last wars have shown this to be the case. The country which can replace its war materials most rapidly in the most advanced form is sure to win the war in the end. This prospect is not a pleasant one to contemplate, but we must face the conditions over which we have no control.

Few people will agree with what I am about to state, but when they have thought these matters over more carefully,

Days from Seventy-Five to Ninety

they may change their minds. Many have placed their hopes in the United Nations, believing that in some magical way this organization would secure universal peace. At the present time such hopes seem to me entirely visionary. Neither the League of Nations nor the United Nations has demonstrated any ability to control any but the very weak peoples of the world. Stronger nations universally have placed their own interests ahead of the world good and have gone their own ways to suit themselves. The United Nations has done and can do nothing about it, and there is no likelihood that it will be able to do so for a very long time to come. If this is so, what must be the outcome in the near future? To me this seems evident, but few will agree with me. Until such time as the United Nations does acquire power to control strong nations, if it ever does, there seems to be only one hopeful solution for world peace. That is to have one nation strong enough to act as world policeman and keep peace and order in the world. This role at present is being thrust upon the United States, whether we like it or not. Circumstances are rapidly bringing this about. Should we defeat Russia either in war or peace, we would have the world power to act as world policeman to keep order and enforce peace. We would have to do this in our own interest whether we like to do it or not. For the first time three modern methods in development have made this both practical and possible: the aeroplane, the atomic and hydrogen bombs, and methods developed with landing craft so that any country bordering the ocean may be successfully attacked. It is most fortunate for the world that this power will fall into the hands of a nation with no territorial ambitions and with a traditional regard for freedom and fair play for others. We could easily have taken over both Mexico and Canada. We

My Philosophy of Life

have given up possession of both Cuba and the Philippines. We have a historical training for this role, beginning with our resistance to British oppression in colonial days. No other nation has such a suitable training and background for this role which is going to be thrust upon us. Should the United Nations ever become able really to control strong nations, I am certain we would gladly relinquish the role of world policeman, a role which I feel sure is not to the taste of the American people.

I am certainly an optimist on the future of America. We are heirs to all the best political experiments of the human race in the past, and we have all types of human material here with which to go on and develop what we have inherited, with less outside interference on our continent than anywhere else in the whole world. Our governmental system, while far from perfect, is the best so far devised by man for forward development, socially and politically. All we have to do is to keep on in the path we have been following for the last 175 years, and correct mistakes and overcome difficulties as they arise, one after the other, and there is no limit to our advancement or that of our descendants. The future is in our hands and will be what we make it by our own works and character.

My Philosophy of Life

OF COURSE I APPRECIATE THAT MY OWN LIFE HAS BEEN ONE of exceptional opportunity and ease, as I have always had enough income for my needs except during periods when I failed, but these were of short duration for I soon pulled myself out of my difficulties. My failures have proved my best

Days from Seventy-Five to Ninety

character builders and I do not regret them. There must be many people who have had similar great opportunities and for them my story can be of value.

Old age with me is, as it should be, the fruition of a long and active life, full of joys, sorrows, mistakes, successes, and failures, all condensed into one integrated personality which ought to be able to give back something for what it has received from life. At least this is my feeling in my later years. In old age one must live well within one's physical capacity and adjust life to the changed conditions old age brings about, but such a life need not be less enjoyable than that which preceded it, only different. If old people would only realize this, many would be far happier. The man who says he is just as well and as able as he ever was, is not only lying, but he is fooling himself and no one else. Human life begins with a period of growth and development, then comes a time of maximum physical and mental activity, after which comes a long period of gradual decline, its length depending on one's inheritance and how well one has looked after one's body and mind during life. Sometimes old age can last almost as long as the active period of life. If this is a possibility, ought we not to prepare for this long closing period, and not leave it to chance or the ministration of others? We can make our old age either the fruition of life, and enjoyable, or a time of regrets, frustration, and sickness. Old age is likely to be what we have made it during our active life. I fortunately realized this early in life and was forced to look after my health through the warning of an early death if I did not do so. My grandfather, Peter Cooper, pointed out to me the necessity of living so that life would have a happy ending. I have worked hard to achieve this end and to make my own old age, if I was

My Philosophy of Life

to have one, as pleasant, active, and interesting as possible. In order to accomplish this, we must do many things actively and conscientiously, and some of them are not easy or pleasant. Our bodily health must be maintained in as good a condition as possible, and we must not do those things which injure our health, no matter how much we like to do them. We are rewarded for this in the building of a stronger character, which everyone needs to get through life. There is little pleasure in an ailing and ineffective body. Few people see this clearly, but continue to do those things which give them pleasure at the time without regard to health, not realizing that the very greatest pleasure in life lies in perfect health, because it is continuous and not temporary.

The most important thing is to have pleasant relations with one's family. If members of the family prove difficult and make mistakes you don't approve of, be tolerant and understanding, not critical, trying to make them do as you think they should. Be sympathetic and help them all you can, and realize that each generation is brought up under different social and moral conditions. Often the rules we thought were absolute, no longer apply at present. Everyone must be allowed to make his own mistakes. It is on this foundation that character and experience are built up. When the older generation try to enforce their ideas too strenuously on the younger, they are sure to become disliked and distrusted. This is why so many younger people have parent trouble. Parents will not give up the active direction of their children when they become adult, and this makes for much unhappiness in the world. Be tolerant and sympathetic, not critical. Far more will be accomplished in this way than in any other. When old age comes on, it is time for older people to surrender their activities to the younger gen-

Days from Seventy-Five to Ninety

eration and not hold on to the direction of affairs to the last moment. Keep enough property for security and comfort, but give the rest to the younger members of the family so that they can learn early to administer it properly. Young couples getting married and starting out in life have a hard time to get ahead and need all the help which can be given them safely. The tree of life can produce either sweet or bitter fruit, and it is up to us to produce only sweet fruit.

If I have learned anything in a long life, it is that this is a world of law, and if we transgress the law in either the physical or moral spheres, we are sure to pay the penalty. If we transgress the laws of nature by faulty living, we can often recover, if too much damage has not been done to our bodies and we follow the laws of health. The same is true of moral law. If we transgress and injure our moral fiber, we can reform, if the damage has not gone too far. If it has, it is often hopeless. My father told me a story which well illustrates this. There was a trustee of the Cooper Union, originally selected by Peter Cooper for his good character and ability, who served many years creditably. He was a most upright citizen and an excellent businessman. When he realized that his end was near, he sent for my father, who was then treasurer of the Cooper Union, to tell him that he had made up his mind to leave his large fortune to the Cooper Union as he had no family except two nephews. They were dissipated young men, who ought not to have his property. A short time later he sent for my father to come to his rooms in the Clarendon Hotel to witness the signing of his will. At five o'clock the lawyer was there with the will, but the trustee delayed the signing under one pretext or another until it became so late that the lawyer had to go. After he had gone the trustee reached out his hand and

My Philosophy of Life

took my father's in his and said slowly, "Mr. Hewitt, I have spent my whole life accumulating this money, and money has been my god in life. Now I cannot bring myself to part with it, even on paper." He burst into tears and turned his face to the wall. He died that night, and the nephews dissipated the fortune, as he had predicted. His moral purpose had been wrong, and dominated him so that he could not take the right course when the crisis came. It was too late.

Religious conversions, or taking the pledge, sometimes have good lasting results, but it is surprising how often they fail later on. The moral fiber is not strong enough to persist in the right.

My own religious and moral beliefs have gone through many phases during my long life. I was, in youth, instructed both in the Presbyterian faith by my teachers and in the Episcopalian faith at Sunday school. As I matured and thought about religious matters, I could not believe in the forgiveness of sins. To me a sin was a sin, and no one could forgive it or excuse it. The only cure was not to commit it again. I could not believe in everlasting life because I could see that this came about because no one can conceive of not being alive. Therefore people believe in its continuance. I did not. I certainly could never believe in the resurrection of the body when its elements had been scattered far and wide, and I could not see usefulness in this. I certainly never could see how an all-seeing and beneficent God could begin to save people only after millions had existed, and then only save a few while the rest of mankind never heard of salvation. This seemed ridiculous to me. I could not understand a beneficent God allowing so much sin and misery in the world. This to me seemed a contradiction in terms. None of the religious beliefs I had been taught took

Days from Seventy-Five to Ninety

any hold of me, and I could not believe in any of them and stay rational myself. I felt that the Negro preacher was right when he said, "Faith is believing something you know ain't so." But what can take its place? Finally I saw a light. Edward Caird in his *Evolution of Religion* defines religion as "the efforts of man to get into better relations with things outside of himself." If this idea is accepted, all religions fall into line. They are good for people if they give strength and comfort. As there are many kinds of people, there must be many kinds of religious beliefs to suit their needs. An idol, a tree, or a river may be as useful to primitives as any spiritual conception is to a more highly developed person. Each should select that which suits him best, and no one should disturb another's faith. I feel very strongly about this. Instruction in ethical and moral principles is good and useful, but even these principles vary with time and circumstances and races. We have our moral code and others have theirs, which they often follow far better than we do ours. If they do, they are good people, so far as their lights go.

Prayer is useful if it searches one's soul and leads one in the right path. If it is for any specific benefit I regard it as an impertinence to the Almighty. I never pray, as it has done me no good in my life. My grandfather felt the same way. He told me that his way was to go over what he had done that day each night before going to sleep, and if he found he had done nothing for others which he regarded as worth while, he felt that that day had been wasted and he resolved to do better the next day. He felt that his best course in life was to act honestly, work hard, and be kind and helpful to others in every way he could. He said that if he did this, the future would look after itself. I am sure he was right.

My Philosophy of Life

My own personal experience with people who have been closely identified with formal religion has been most discouraging. I have found them not only not better than others, but much worse. I have known nine ministers of the church in my life, and five of them were either immoral or financially crooked. This is too large a proportion and seems to indicate that formal religion has little or no influence on conduct. Religious organizations seem often to get on the wrong track as was the case with the Catholic Church when they sold indulgences for committing sins; the greater the sin, the higher the price. They also received money for the remission of sins. The same kind of thing is going on today. A Methodist minister came to see us to get a subscription for his church. After lunch the conversation turned on the church's prohibiting card playing. He said that, of course, ordinary playing cards were wicked and an invention of the Devil, but that the Methodist Church provided special Methodist cards, at two dollars a pack, with which Methodist Poker could be played without sin. He did not get any subscription from us.

Common sayings such as "Honesty is the best policy," or Mark Twain's version of it, "Sonny, always tell the truth, it will please some and astonish the rest," are not fundamentally based on right and wrong, but they involve a reward. In fact nearly all religious teachings derive their force from this means. They are followed because they are based on personal advantage in the future. In the Old Testament we read, "That thy days shall be long in the land the Lord, thy God, giveth thee." Christ's teachings are full of rewards in Heaven. Mohammed promised a heaven full of houris. Great religious teachers did stress great moral laws, and Christ most of all. This is what gave force to his teachings, together with per-

Days from Seventy-Five to Ninety

sonal righteousness and responsibility. This was part of his powers, but pure moral or ethical teaching has little appeal to the mass of people, as is seen in our times by the small followings of the Ethical Culture Society. The great following obtained by the Christian Science Church is probably due to the health rewards promised believers. In speaking of moral law, I mean that which is accepted among civilized races and not that of less developed peoples, where it is often followed better than it is here.

Everyone knows that masses of people are swayed by dynamic personalities. We do not know what this powerful force is, or how it works, but there is no doubt of it. Look at the influence of Billy Graham, today preaching the same religion that is weekly heard in churches, and yet it falls by the wayside there. Christ must have had similar and greater power. This dynamic force can be either for good or evil; it has equal force in each direction. Look at Lenin, Hitler, and Mussolini. They swayed millions and induced them to give up their liberty; they shook the world. It is not at all likely that the world will ever be ruled by moral or ethical law. Its ruling force is only for the few in this world. It has been preached by many in various forms, by Confucius, Buddha, Zoroaster, Christ, and Mohammed. But they all had to use the incentive of personal advantage to get their message across. Abstract right and justice has little appeal to large numbers of people. Those who do not require incentives are few in this world, and lonely. They always will be.

I have read the Bible through from cover to cover recently, to see what impression it would make on me in my old age. When I was young, only the salient parts were stressed, and

My Philosophy of Life

no idea given of the whole. How can anybody reading the Bible through regard it as a divine book? It gives a wonderful account of the Jewish race and their disgraceful conquest of the Promised Land. If there ever was a worse people than this so-called "chosen people," we have no record of them. There is much beautiful poetic literature, the best of it written by David, who was a murderer. The Deity pictured in the Old Testament is a God of wrath, jealous, autocratic, unreasonable, and fickle. He is pictured as a despot, ruling only by fear and rewards. There is no teaching of personal morality or responsibility. Only obedience to decrees.

In the New Testament, there is teaching of love of fellow-man, personal morality, forgiveness, compassion, and personal righteousness. But it is based on rewards in the after life, not goodness for its own sake. It is the most advanced moral teaching yet set forth, and in that sense it is divine.

The teachings of Christ had little following in his own time, and for a long time after. There would have been no Christian church if it had not been organized by St. Paul, who had the dialectic genius of the Greek philosophers. He was the only educated man among the early Christians.

The early Church found that it made little headway without a feminine member of the divinity and introduced the personality of the Virgin Mary, with no warrant whatever in Scripture. It also found that Christian festivals were little observed and made no headway against the old pagan customs; so it changed the Christian dates to correspond with the old pagan ones. The Resurrection at Easter was made to correspond with the spring festival which had always been observed. Finally, the Christian religion became formalized, with all kinds of separate beliefs. It remains so today.

Days from Seventy-Five to Ninety

The divinity of Christ was discussed for hundreds of years, and finally a great conclave of all the dignitaries of the existing church assembled at Nicea to decide the question. They debated for six months, but just remained equally divided on the issue. Finally the Emperor Constantine became very weary of this endless debate and journeyed to Nicea, and, sitting on his throne, he said that as the church was unable to settle the divinity of Christ, he would settle it himself. He decided that Christ was divine and told them they could all go home. Christ was made divine by Constantine and not by the church. He has been accepted as such by most Christians since then.

Knowing all this, how can I accept the doctrines of any Christian belief? No rational person could, if he knew the facts.

I think I can say that my ruling desire through life has been an accomplishment through work and study. Whenever I have completed a job it loses interest for me, and I want to get on to the next thing. My sister Sally once said truly, "Drink runs in some families, and work runs in ours. I don't know which is worse."

I perhaps have been fortunate in not having been submitted to as many temptations as most people. I have never had any desire for dissipation, I have always disliked smoking, and I never cared for the stimulation of alcohol in any form. This is not virtue, it just happens to be the way I am made. If I had been made the same as many other people, I might easily have behaved as they did, but I have been fortunate in my make-up and inheritance. Few of our family, for several generations, have smoked, and none of them were ever addicted to drink. I only hope these traits will be carried on to succeeding gen-

The Future

erations as they are of the greatest help in life. So far as I have observed, none of the children or grandchildren seem to have any tendencies toward dissipation in any way; few of them smoke.

The Future

A SHORT TIME AGO I HAD A DREAM ABOUT THE FUTURE. I dreamed that I was engineer on an old-fashioned steam locomotive, such as I used to drive as a young man on the New York and Greenwood Lake Railroad, which my father owned. It was night and four cars were attached to the engine. The bell rang and I pulled back the throttle, and the engine sped out into the darkness. After a few miles the oil headlight went out, and the fireman and I relit it. This occurred several times and then I sent the fireman back for the conductor, as I could not go ahead in the dark. He came, and was a Russian officer with astrakan cap and medals and with two large revolvers in his belt. He said, "You will drive ahead full speed, and drive like hell." Then he poked a revolver in my ribs, so I pulled the throttle. He disappeared, and Mrs. Hewitt was sitting at my side with her hand on my knee. She said, "Drive ahead, Teddy, into the dark without fear. Everything will be all right, for I know."

What will that future be? Who knows? I am ready for it.

On the night of my ninetieth birthday I had the following dream which I wrote down at once:

Dammit, I am ninety years of age,
But I can still write and work and rage.
There are compensations at this stage.

Days from Seventy-Five to Ninety

To friends and family by the score
I can talk, amuse, and bore.
I have my health and sight and hair,
So why not stay for my hundredth year?

I have never met anyone who seemed more at peace with himself than I am, and this would indicate that the religious views I hold are the right ones for me. I take full responsibility for the actions of my past life and want no remission of sins or atonement. I have led a full life and believe I have added my mite to the sum of human knowledge and somewhat to its material wealth. I have the love and respect of my family and friends and no enemies that I know of. In summing up, I feel that I have lived a most successful life, and one full of continued interest. I have been blessed with the best life companion a man ever had. I only wish I could feel that I would join her in the great beyond.

My Latest and Best Work

AFTER I HAD READ THE PROOF SHEETS OF THIS BOOK AND returned them to the publishers, I started work on a new project I had had in mind for a long time. It has been known for many years that when a nitrogenous fertilizer liberates ammonia into the soil, soil bacteria are stimulated to consume this ammonia as food, and they do this rapidly, locking up much of this ammonia in their bodies and making it unavailable to plants. When these bacteria die, the decay of these organisms again sets free the nitrogen for plant use. Some of this ammonia gets locked up in the humus of the soil and may stay there for many years before the decay of this humus again sets this ammonia free for plant sustenance. It has been stated that under favorable conditions of temperature and moisture, the soil bacteria can consume as much as 25 pounds of nitrogen a day per acre. This is of course a most serious loss and expense to agriculture. As much as 400 pounds of nitrogen to the acre have been added to land in the early spring without materially increasing the protein in the hay when cut.

Before doing any work on this project, I wrote to several of the leading authorities on this subject, asking if anything was yet known which would prevent soil bacteria from consuming ammonia for a reasonable time without injury to growing plants or killing all the other soil bacteria, which would injure the fertility of the land, thus allowing the grow-

ing plants to get more of the nitrogen applied to the soil. They all replied that this had been done so far only by sterilizing the soil with strong chemicals and that this process was both expensive and impractical.

It happened that my grandson, Peter Cooper Stevenson, was spending his vacation with us and we discussed this problem. He is a chemist and physicist for the Atomic Energy Commission at their great laboratory at Livermore, California. He suggested the use of a material of which he happened to know the properties in relation to bacteria. I secured some of this and went to work on the problem. My experiments were crude at first, but I soon developed simple and accurate means of experimentation and it became evident that this material would do what was wanted if properly used. It had no injurious effects on plants when used at a concentration ten times as high as was necessary for my purposes. Used in only one part to 5,000 parts of urea, it makes nearly all the ammonia available to hay plants while soil bacteria get little of it for two or three weeks. It does not kill all the soil bacteria or injure the fertility of the land in any way. The cost of accomplishing this result is nominal—only a few cents an acre—and the material can be incorporated in urea or in gaseous ammonia or in ammonia solutions with equally good results. I have not yet had time to find out just how long the effects of this material will last in the soil, but I do know that it disappears in time. The time of its action seems to be just right for increasing the protein in growing hay so that it can be cut with a high protein content. There has not yet been time to try this out on a growing crop. This will be done exhaustively. I do not yet know what effects it will have

on the consumption of nitrates by soil bacteria, but this will be investigated.

I believe that this discovery is by far the most valuable I have ever made in my life, and that it will prove to be worth hundreds of millions to the farmers of the United States as they will be able to get results with less than half the nitrogen which must be used at present. Nitrogen costs farmers about 12 cents a pound and if they can save half of it, this will amount to an enormous sum. I have no doubt now that this will take place in time. I will of course make a full disclosure of this process as soon as the patents, which are now being drawn up, are in hand.

This discovery, I am convinced, is the most far-reaching and useful of any I have made in my life, and I am delighted to have it come at the end, after my ninetieth birthday. I felt strongly that it would be of interest to readers to know that original work of value can be done in old age and that it does not have to stop with middle life. I thought it worth while to ask my publishers if they could not add a few more pages to the book, which was already off press, and they have kindly consented to do this for me.

This will probably be my last contribution to our economy, and I am glad to have the best come at the end of life.

UNIVERSAL
LIBRARY



126 061

UNIVERSAL
LIBRARY